Connecticut River

Watershed Summary

Watershed Description and Maps

The Connecticut River watershed covers an area of approximately 102,605 acres throughout the central portion of Connecticut (Figure 1). There are 18 municipalities located at least partially in the watershed, including Suffield, Enfield, Windsor, Windsor Locks, South Windsor, East Windsor, Hartford, East Hartford, Wethersfield, Glastonbury, Rocky Hill, Cromwell, Portland, East Hampton, Middletown, Haddam, East Haddam, and Chester, CT.

The Connecticut River watershed includes two segments impaired for recreation due to elevated bacteria levels. The impaired segments are CT4000-00_01 (Segment 1) and CT4000-00_03 (Segment 3). These segments were assessed by Connecticut Department of Energy and Environmental Protection (CT DEEP) and included in the CT 2010 303(d) list of impaired waterbodies. Some segments in the watershed are currently unassessed as of the writing of this document. This does not suggest that there are no issues on these segments, but indicates a lack of current data to evaluate the segments as part of the assessment process. An excerpt of the Integrated Water Quality Report is included in Table 1 to show the status of some of the other waterbodies in the watershed (CT DEEP, 2010).

The Connecticut River is the largest river in New England. It flows through New Hampshire, Vermont, and Massachusetts before entering Connecticut at the Suffield – Enfield town border. Segment 3 of the Connecticut River begins as the river flows into Connecticut, continues south through 13 municipalities, and ends adjacent to Gildersleeve Island along the Cromwell – Portland town border. Segment 3 consists of 35.26 miles of the river in Suffield, Enfield, Windsor Locks, East Windsor, Windsor, South Windsor, Hartford, East Hartford, Wethersfield, Glastonbury, Rocky Hill, Cromwell, and Portland (Figure 2).

Segment 1 of the Connecticut River is located downstream of Segment 3. It begins at the northern most boundary of Hurd State Park along the East

Impaired Segment Facts

Impaired Segments:

1. Connecticut River (CT4000-00_01)
2. Connecticut River (CT4000-00_03)

Municipalities: Suffield, Enfield, Windsor, Windsor Locks, South Windsor, East Windsor, Hartford, East Hartford, Wethersfield, Glastonbury, Rocky Hill, Cromwell, Portland, East Hampton, Middletown, Haddam, East Haddam, and Chester

Impaired Segment Length:
CT4000-00_01 (10.27 miles)
CT4000-00_03 (35.26 miles)

Water Quality Classifications:
Class B

Designated Use Impairments:
Recreation

Sub-regional Basin Name and Code:
Connecticut River, 4000

Regional Basin: Connecticut Main Stem

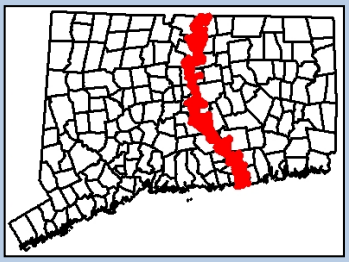
Major Basin: Connecticut

Watershed Area (acres): 102,605

MS4 Applicable? Yes

Applicable Season: Recreation Season (May 1 to September 30)

Figure 1: Watershed location in Connecticut



Hampton – Middletown town border, flows south through Haddam and into East Haddam and Chester, and ends at the head of the estuary at the Chapman Pond outlet along the East Haddam – Chester town border. Segment 1 consists of 10.27 miles of the Connecticut River in the municipalities of Middletown, East Hampton, Haddam, East Haddam, and Chester (Figure 2).

Both impaired segments of the Connecticut River have a water quality classification of B. Designated uses include habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. Segment 1 and Segment 3 are impaired due to elevated bacteria concentrations, affecting the designated use of recreation. As there are no designated beaches in these segments of the Connecticut River, the specific recreation impairment is for non-designated swimming and other water contact related activities.

Table 1: Impaired segments and nearby waterbodies from the Connecticut 2010 Integrated Water Quality Report

Waterbody ID	Waterbody Name	Location	Miles	Aquatic Life	Recreation	Fish Consumption
CT4000-00_01	Connecticut River-01	From head of estuary at Chapman Pond outlet, East Haddam, US to northern most boundary of Hurd State Park, East Hampton.	10.27	U	NOT	NOT
CT4000-00_02	Connecticut River-02	From northern most boundary of Hurd State Park, East Hampton, US to confluence with Reservoir Brook (adjacent to Gildersleeve Island), Portland.	10.49	U	NOT	NOT
CT4000-00_03	Connecticut River-03	From Reservoir Brook confluence (adjacent to Gildersleeve Island), Portland, US to MA border.	35.26	U	NOT	NOT

Shaded cells indicate impaired segment addressed in this TMDL

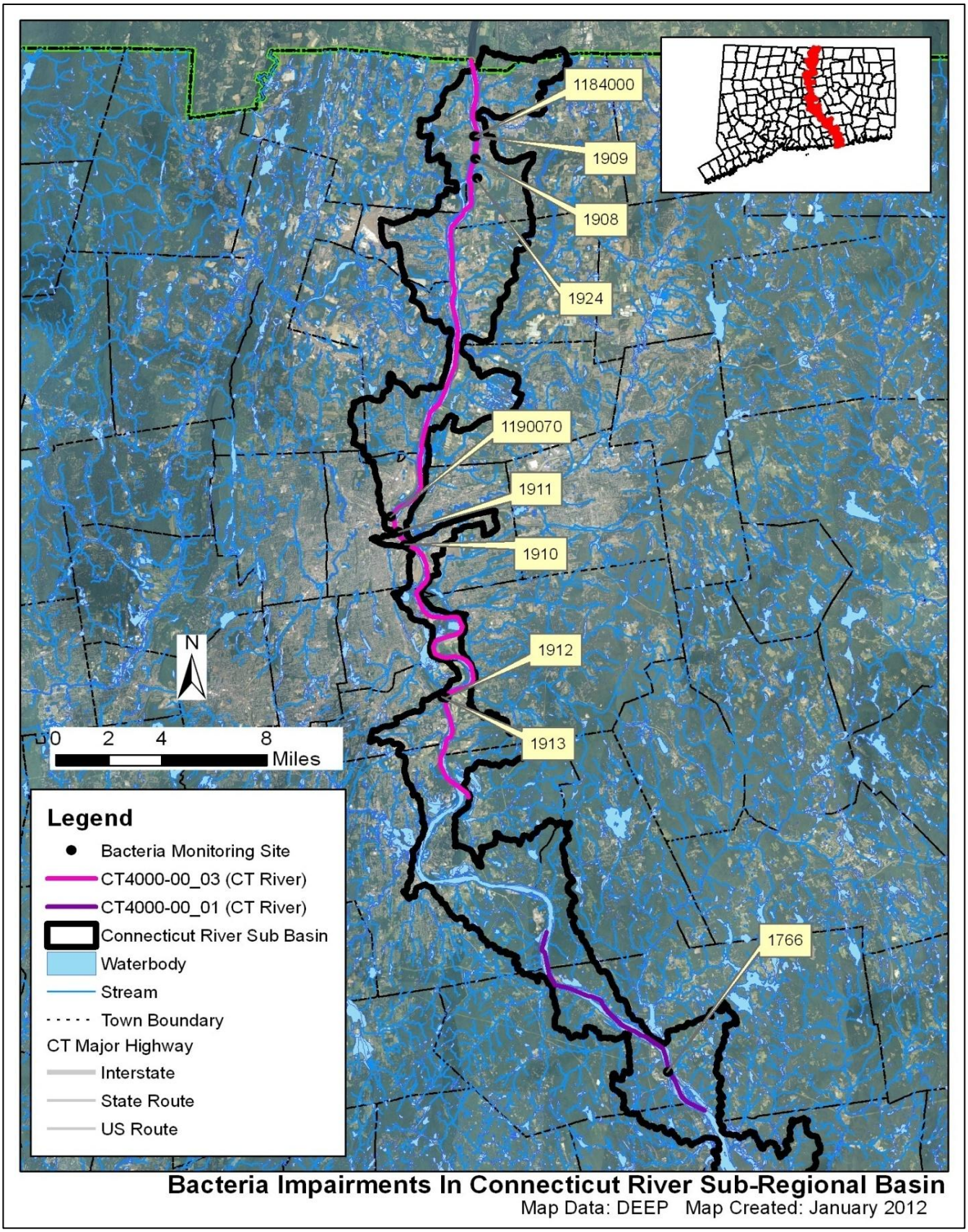
FULL = Designated Use Fully Supported

NOT = Designated Use Not Supported

U = Unassessed

Segment 2 (CT4000-00_02) listed above did not contain any sampling station with viable bacteria data to generate load reduction goals. The segment is therefore not included in this TMDL document, and the impairment will be addressed in the future.

Figure 2: GIS map featuring general information of the Connecticut River watershed at the sub-regional level



Land Use

Existing land use can affect the water quality of waterbodies within a watershed (USEPA, 2011c). Natural processes, such as soil infiltration of stormwater and plant uptake of water and nutrients, can occur in undeveloped portions of the watershed. As impervious surfaces (such as rooftops, roads, and sidewalks) increase within the watershed landscape from commercial, residential, and industrial development, the amount of stormwater runoff to waterbodies also increases. These waterbodies are negatively affected as increased pollutants from nutrients and bacteria from failing and insufficient septic systems, oil and grease from automobiles, and sediment from construction activities become entrained in this runoff. Agricultural land use activities, such as fertilizer application and manure from livestock, can also increase pollutants in nearby waterbodies (USEPA, 2011c).

As shown in Figures 3, 4, and 5, the Connecticut River watershed consists of 37% forest, 32% urban area, 20% water, and 11% agriculture. The southern portions of the watershed surrounding Segment 1 (Figure 4) are dominated by forested land use with scattered urban areas and a few agricultural areas. By contrast, the northern portions of the watershed surrounding Segment 3 are dominated by urban land use. Segment 3 flows through some of the most developed areas of Connecticut, including the City of Hartford, Connecticut's most populous city. There are also large tracts of agricultural land adjacent to Segment 3 in Suffield, South Windsor, East Windsor, Glastonbury, and Rocky Hill. Though agricultural land use occupies only approximately 11% of the watershed, most of the agricultural operations in the watershed are located adjacent to Segment 3 (Figure 5).

Figure 3: Land use within the Connecticut River watershed

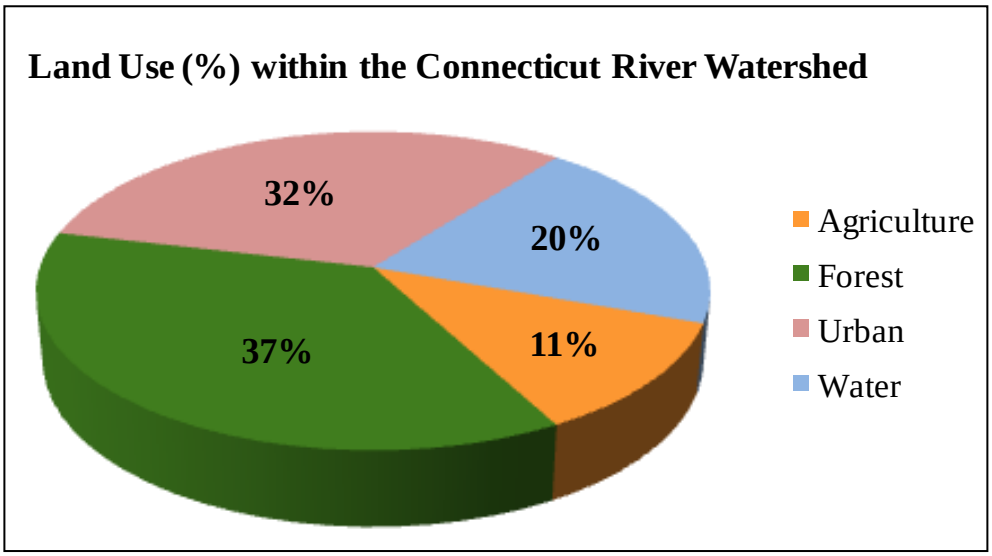


Figure 4: GIS map featuring land use for the Connecticut River watershed at the sub-regional level (CT4000-00_01)

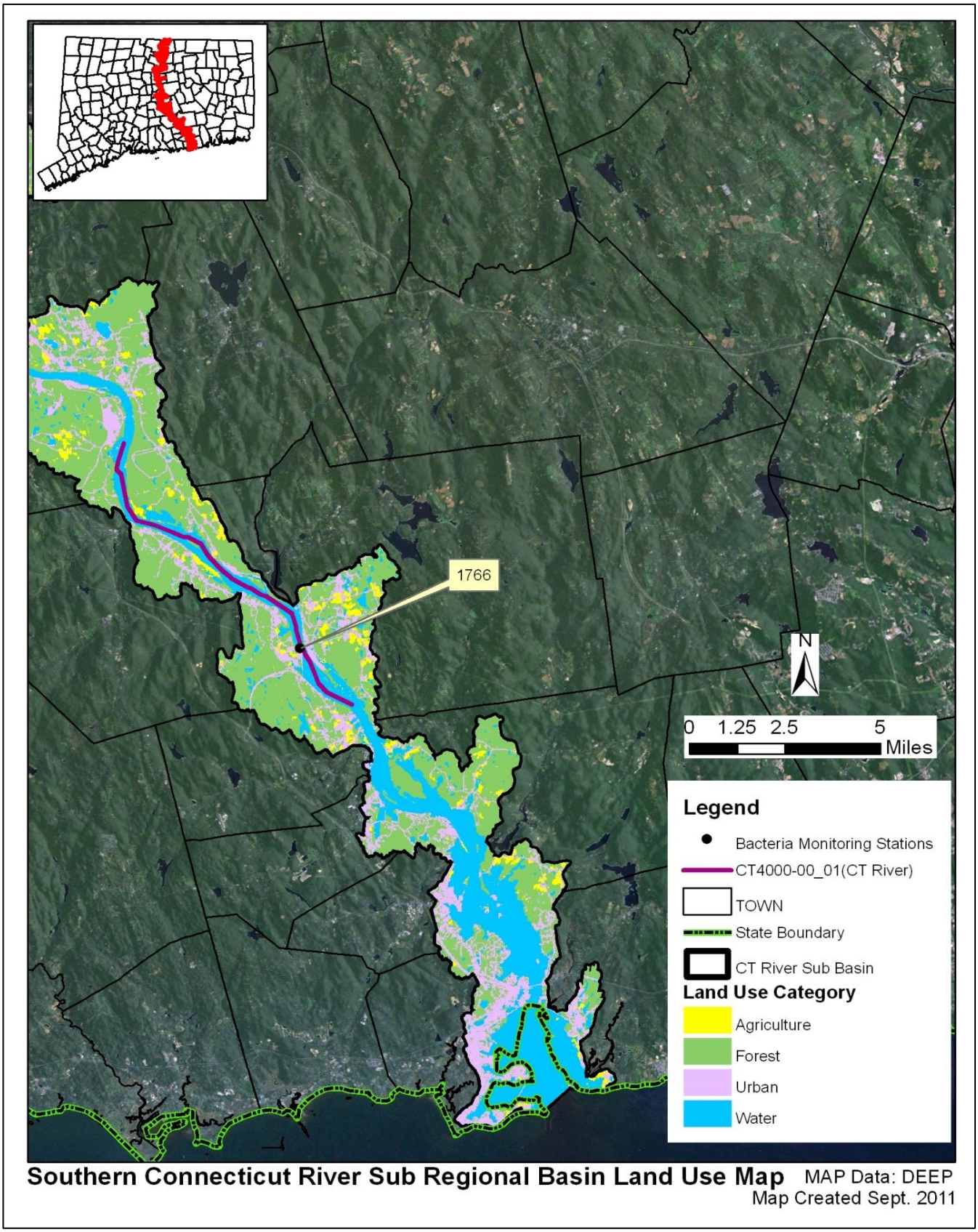
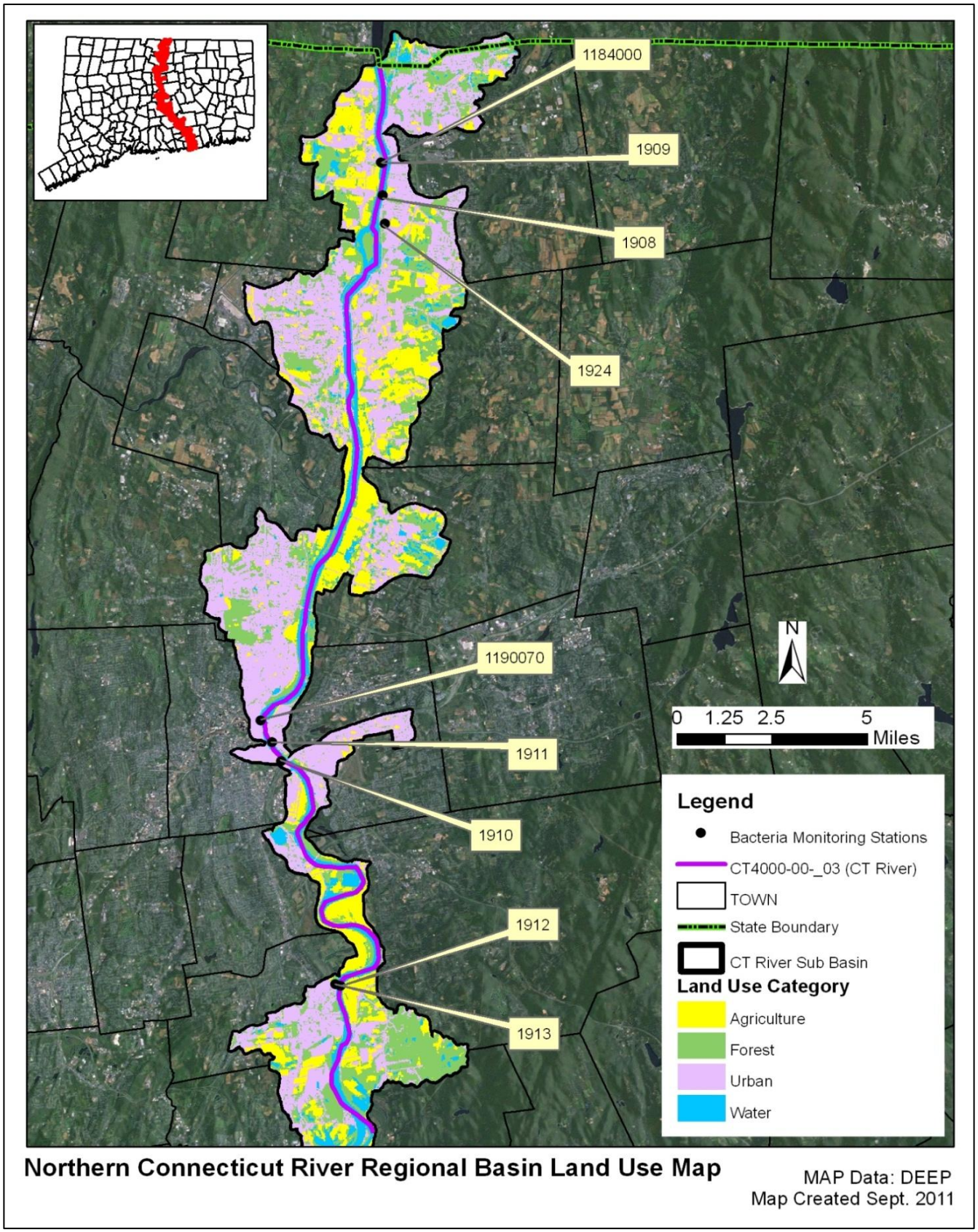


Figure 5: GIS map featuring land use for the Connecticut River watershed at the sub-regional level (CT4000-00_03)



WHY IS A TMDL NEEDED?

E. coli is the indicator bacteria used for comparison with the CT State criteria in the CT Water Quality Standards (WQS) (CTDEEP, 2011). All data results are from CT DEEP, USGS, Bureau of Aquaculture, or volunteer monitoring efforts at stations located on the impaired segments.

Table 2: Sampling station location description for the impaired segments in the Connecticut River Watershed (stations organized downstream to upstream)

Waterbody ID	Waterbody Name	Station	Station Description	Municipality	Latitude	Longitude
CT4000-00_01	Connecticut River	1766	Connecticut River at East Haddam	East Haddam	41.451389	-72.465278
CT4000-00_03	Connecticut River	1912	Glastonbury Ferry Dock	Glastonbury	41.665810	-72.627238
CT4000-00_03	Connecticut River	1913	Rocky Hill Ferry Dock	Rocky Hill	41.666308	-72.629586
CT4000-00_03	Connecticut River	1910	Charter Oak Landing Boat Launch	Hartford	41.753581	-72.657137
CT4000-00_03	Connecticut River	1911	Great River Park Boat Launch	East Hartford	41.760905	-72.661832
CT4000-00_03	Connecticut River	1190070	Connecticut River at Hartford	Hartford	41.769444	-72.667778
CT4000-00_03	Connecticut River	1924	Kings Island State Boat Ramp	Enfield	41.963360	-72.603740
CT4000-00_03	Connecticut River	1908	Parsons Rd near RR crossing	Enfield	41.974426	-72.605014
CT4000-00_03	Connecticut River	1909	Entrance to Canal	Suffield	41.987055	-72.605120
CT4000-00_03	Connecticut River	1184000	Connecticut River at Thompsonville	Thompsonville	41.987222	-72.605833

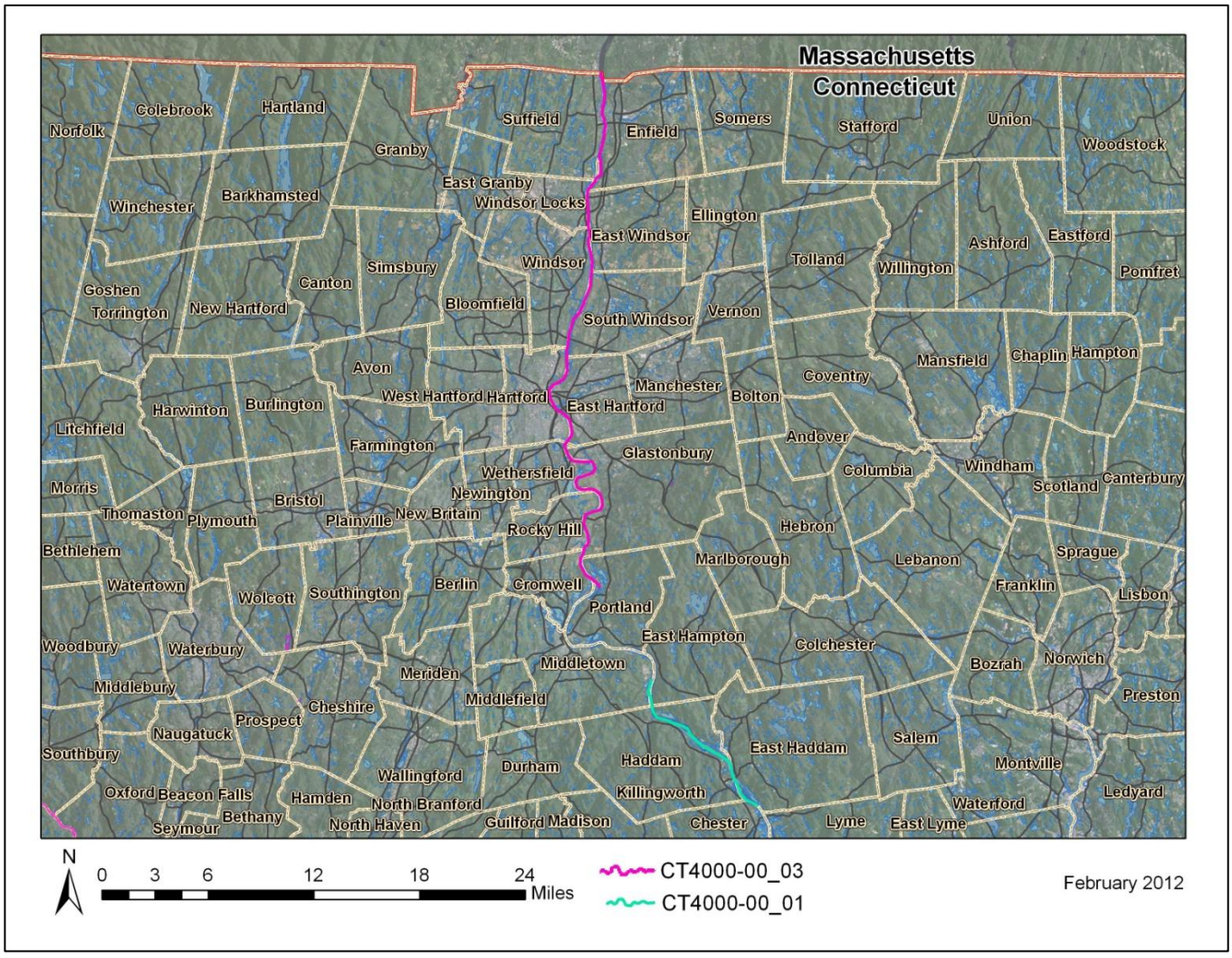
Both segments of the Connecticut River (CT4000-00_01 and CT4000-00_03) are considered to be Class B freshwater rivers (Figure 6). The applicable designated uses are habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. Water quality analyses were conducted using data from one sampling location on Segment 1 (Station 1766) and seven sampling locations on Segment 3 (Stations 1912, 1913, 1910, 1911, 1190071, 1924, 1908, 1909, and 1184000) (Table 2).

The water quality criteria for *E. coli*, along with bacteria sampling results from 2003-2009 are presented in Table 18 for Segment 1. The water quality criteria for *E. coli*, along with bacteria sampling results from 2003-2010, are presented in Table 19 for Segment 3. For Segment 1, single sample values for Station 1766 exceeded the WQS for *E. coli* at least once in every sample year. The annual geometric mean was calculated for Station 1766 on Segment 1 and exceeded the WQS for *E. coli* in every sample year. For Segment 3, single sample values at all stations exceeded the WQS for *E. coli* at least once in almost all sample years. The annual geometric mean was calculated for all stations on Segment 3 and exceeded the WQS for *E. coli* in at least one year for all stations, except Station 1184000.

To aid in identifying possible bacteria sources, the geometric mean was also calculated for wet-weather and dry-weather sampling days for all stations. The geometric mean during wet-weather exceeded the WQS for *E. coli* for Station 1776 on Segment 1. The geometric mean during wet-weather exceeded the WQS for *E. coli* for all stations on Segment 3. For Stations 913, 910, and 911 on Segment 3, the geometric mean during wet-weather was more than five times greater than dry-weather.

Due to the elevated bacteria measurements presented in Tables 18 and 19, Segment 1 and Segment 3 of the Connecticut River did not meet CT's bacteria WQS, were identified as impaired, and were placed on the CT List of Waterbodies Not Meeting Water Quality Standards, also known as the CT 303(d) Impaired Waters List. The Clean Water Act requires that all 303(d) listed waters undergo a TMDL assessment that describes the impairments and identifies the measures needed to restore water quality. The goal is for all waterbodies to comply with State WQS.

Figure 6: Aerial map of the Connecticut River



POTENTIAL BACTERIA SOURCES

Potential sources of indicator bacteria in a watershed include point and non-point sources, such as stormwater runoff, agriculture, sanitary sewer overflows (collection system failures), illicit discharges, and inappropriate discharges to the waterbody. Potential sources that have been tentatively identified in the watershed based on land use (Figures 3 and 4) and a collection of local information for the impaired waterbody is presented in Table 3 and Figure 7. However, the list of potential sources is general in nature and should not be considered comprehensive. There may be other sources not listed here that contribute to the observed water quality impairment in the study segments. Further monitoring and investigation will confirm listed sources and discover additional ones. Some segments in this watershed are currently listed as unassessed by CT DEEP procedures. This does not suggest that there are no potential issues on this segment, but indicates a lack of current data to evaluate the segment as part of the assessment process. For some segments, there are data from permitted sources, and CT DEEP recommends that any elevated concentrations found from those permitted sources be addressed through voluntary reduction measures. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement these TMDLs.

Table 3: Potential bacteria sources in the Connecticut River watershed

Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Agricultural Activity	Stormwater Runoff	Nuisance Wildlife/Pets	Other
Connecticut River CT4000-00_01	x	x		x	x	x	x	
Connecticut River CT4000-00_03	x	x	x	x	x	x	x	

Figure 7: Potential sources in the Connecticut River watershed at the sub-regional level (CT4000-00_01)

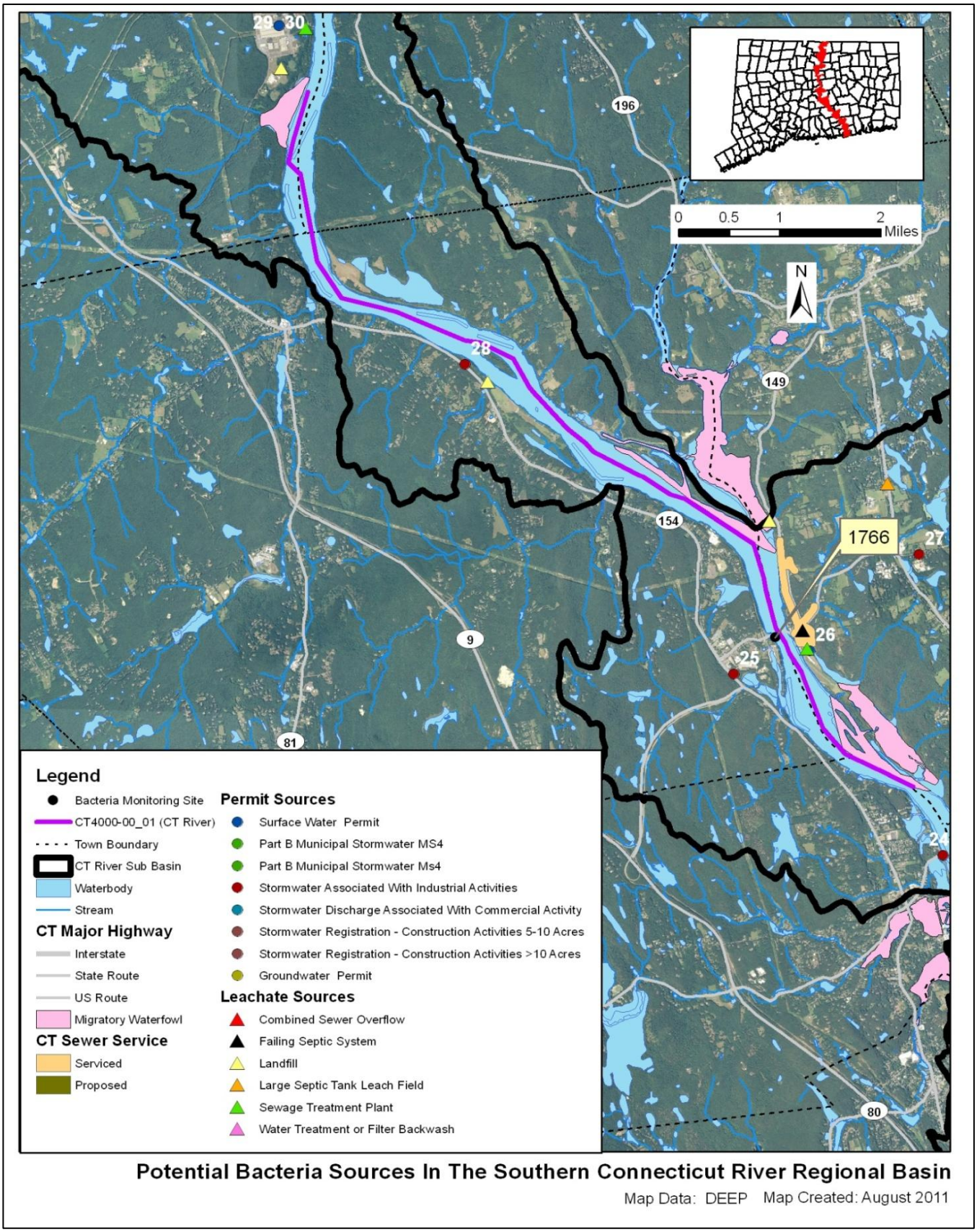
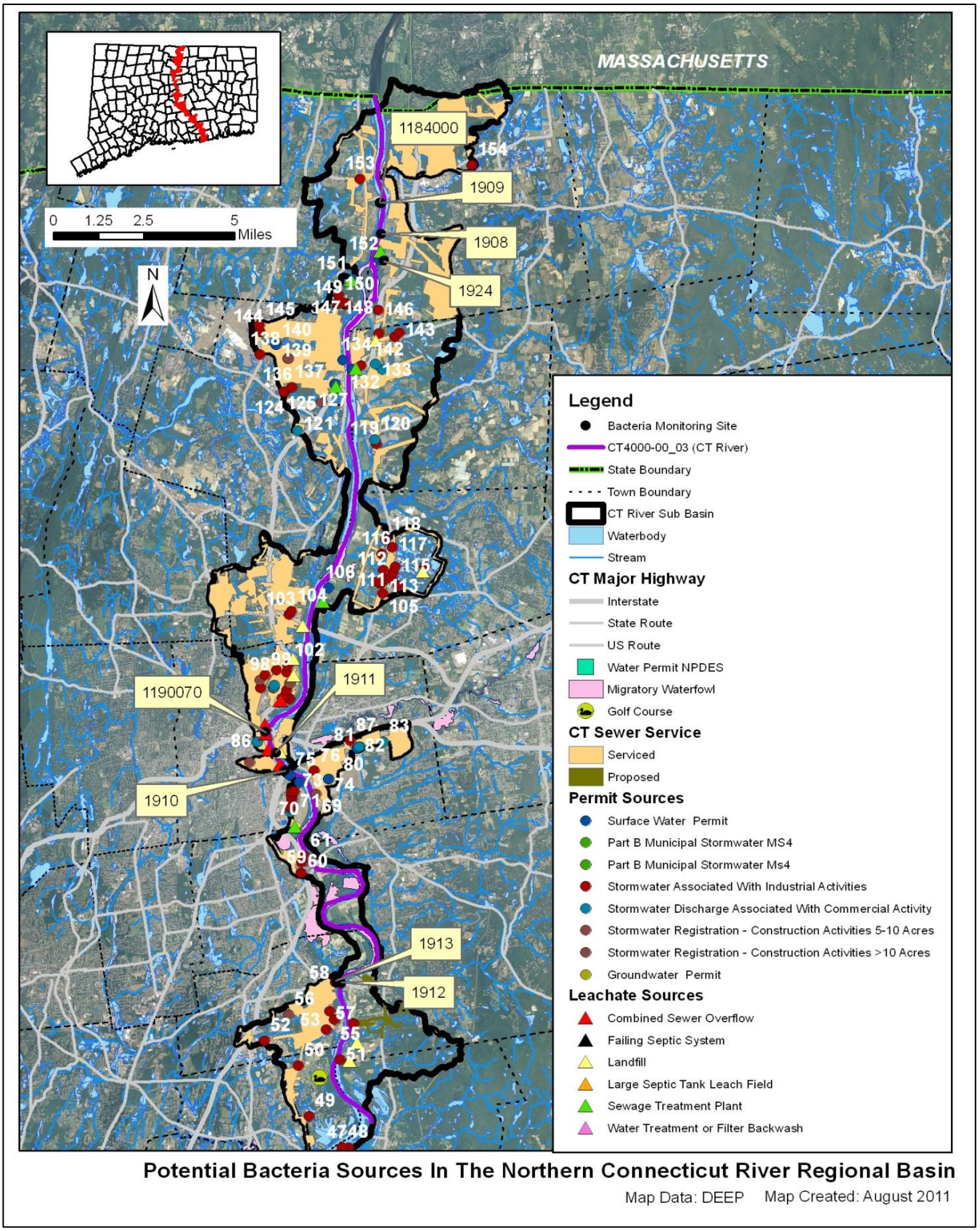


Figure 8: Potential sources in the Connecticut River watershed at the sub-regional level (CT4000-00_03)



The potential sources map for the impaired basin was developed after thorough analysis of available data sets. If information is not displayed in the map, then no sources were discovered during the analysis. The following is the list of potential sources that were evaluated: problems with migratory waterfowl, golf course locations, reservoirs, proposed and existing sewer service, cattle farms, poultry farms, permitted sources of bacteria loading (surface water discharge, MS4 permit, industrial stormwater, commercial stormwater, groundwater permits, and construction related stormwater), and leachate and discharge sources (agricultural waste, CSOs, failing septic systems, landfills, large septic tank leach fields, septage lagoons, sewage treatment plants, and water treatment or filter backwash).

Point Sources

Permitted sources within the watershed that could potentially contribute to the bacteria loading are identified in Table 4. This table includes permit types that may or may not be present in the impaired watershed. A list of active permits in the watershed is included in Table 5. Additional investigation and monitoring may reveal the presence of additional discharges in the watershed. Available effluent data from each of these permitted categories found within the watershed are compared to the CT State WQS for the appropriate receiving waterbody use and type (Table 6).

Table 4: General categories list of other permitted discharges

Permit Code	Permit Description Type	Number in watershed
CT	Surface Water Discharges	17
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	11
GSI	Stormwater Associated with Industrial Activity	91
GSM	Part B Municipal Stormwater MS4	15
GSN	Stormwater Registration – Construction	8
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	0

Permitted Sources

As shown in Table 5, there are a large number of permitted discharges in the Connecticut River watershed. Bacteria data from 2001-2003 from many of these industrial permitted facilities are included in Table 6. Though this data cannot be compared to a water quality standard as there is no recreation standard for fecal coliform bacteria, numerous samples were high. The following permitted industrial facilities had outfalls with readings greater than 1,000 colonies/100 mL: Connecticut Natural Gas Corp. (GSI1506), Pratt & Whitney (GSI000660), Wood Group Fuel Systems (GSI001361), Engelhard Corporation (GSI001433), Mercury Exelum (GSI000539), Qubecor World/Infinity Graphics (GSI001061), DeMilo & Company (GSI001438), All Waste (GSI001518), Covanta Mid-CT (GSI001532), CRRA-Hartford Landfill (GSI000500), The Metropolitan District (GSI000597), Connecticut Transit (GSI000696), CT DOT Brainard Airport (GSI000915), United Technologies – Pratt & Whitney (GSI000126), Waste Management N.E.E.T. (GSI001311), United Oil Recovery (GSI001389), Portland Boat Works (GSI000270), C. White & Son (GSI001460), Neyra Industries (GSI000485), Town

of Wethersfield Public Works Garage (GSI001214), Amerada Hess Corp (GSI000619), N.E. Petroleum (GSI000687), Taylor & Fenn Company (GSI000552), FedEx (GSI001250), Ahlstrom Dexter (GSI001383), and CNF, Inc. (GSI001324). These results indicate that permitted facilities in the Connecticut River watershed may be contributing bacteria to the impaired segments.

Since the MS4 permits are not targeted to a specific location, but the geographic area of the regulated municipality, there is no one accurate location on the map to display the location of these permits. One dot will be displayed at the geographic center of the municipality as a reference point. Sometimes this location falls outside of the targeted watershed and therefore the MS4 permit will not be displayed in the Potential Sources Map. Using the municipal border as a guideline will show which areas of an affected watershed are covered by an MS4 permit.

Table 5: Permitted facilities within the Connecticut River watershed

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Chester	State Of Connecticut Department Of Transportation	GSI002331	Stormwater Associated With Industrial Activities	Chester Ferry Dock	24
Chester	Town of Chester	GSM000058	Part B Municipal Stormwater MS4	Chester, Town Of	N/A
Cromwell	Cromwell Concrete Products, Incorporated	GSI000471	Stormwater Associated With Industrial Activities	Cromwell Concrete Products Inc.	50
Cromwell	Ripley Co Inc	GSI001237	Stormwater Associated With Industrial Activities	Ripley Company	49
Cromwell	Town of Cromwell	GSM000061	Part B Municipal Stormwater MS4	Cromwell, Town Of	N/A
East Haddam	Town Of East Haddam	CT0101761	Surface Water Permit	East Haddam Wpcf	26
East Haddam	Town Of East Haddam	GSI001387	Stormwater Associated With Industrial Activities	East Haddam Public Works Garage	27
East Hampton	Town Of East Hampton	CT0024694	Surface Water Permit	East Hampton-Colchester Wtp	39
East Hampton	Town Of East Hampton	GSI001413	Stormwater Associated With Industrial Activities	East Hampton Public Works Garage	37
East Hampton	Town Of East Hampton, East Hampton - Colchester Joint Facilities	GSI001884	Stormwater Associated With Industrial Activities	East Hampton-Colchester Wtp	38
East Hartford	United Technologies Corporation	CT0001376	Surface Water Permit	Utc/Pratt & Whitney	74
East Hartford	The Metropolitan District	CT0100170	Surface Water Permit	East Hartford Wpcf (Mdc)	80
East Hartford	National Amusements, Inc.	GSC000136	Stormwater Discharge Associated With Commercial Activity	Showcase Cinemas East Hartford	83

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
East Hartford	Northland Aeg Llc	GSC000227	Stormwater Discharge Associated With Commercial Activity	The Stadium At Rentschler Field	81
East Hartford	Rfdc Ii, Llc	GSC000372	Stormwater Discharge Associated With Commercial Activity	Rentschler Field	82
East Hartford	State Of Connecticut DOT	GSI000016	Stormwater Associated With Industrial Activities	East Hartford Facility	87
East Hartford	Coca-Cola Refreshments Usa, Inc.	GSI000172	Stormwater Associated With Industrial Activities	Coca-Cola East Hartford	76
East Hartford	United Technologies Corporation	GSI000660	Stormwater Associated With Industrial Activities	Pratt & Whitney Andrew Willgoos Turbine Laboratory	79
East Hartford	United Technologies Corporation	GSI000803	Stormwater Associated With Industrial Activities	Utc/Pratt & Whitney	73
East Hartford	The Metropolitan District	GSI001670	Stormwater Associated With Industrial Activities	East Hartford Wpcf (Mdc)	78
East Hartford	Town of East Hartford	GSM000027	Part B Municipal Stormwater MS4	East Hartford, Town Of	NA
East Hartford	211 Riverside Llc	GSN001680	Stormwater Registration - Construction Activities 5-10 Acres	Goodwin College Riverfront Campus	69
East Windsor	Town Of East Windsor	CT0100196	Surface Water Permit	East Windsor Sewage Treatment	130
East Windsor	Town Of East Windsor	CT0100196	Surface Water Permit	Town Of East Windsor Wpcf	131
East Windsor	Southern Auto Sales, Inc.	GSC000243	Stormwater Discharge Associated With Commercial Activity	Southern Auto Sales, Inc.	120
East Windsor	Wal-Mart Stores East, Lp	GSC000280	Stormwater Discharge Associated With Commercial Activity	Wal-Mart Store #2282	133
East Windsor	Insurance Auto Auctions Inc	GSC000315	Stormwater Discharge Associated With Commercial Activity	Insurance Auto Auctions	128
East Windsor	State Of Connecticut Department Of Transportation	GSI000019	Stormwater Associated With Industrial Activities	East Windsor Maintenance Facility	142
East Windsor	Nlr, Inc.	GSI000108	Stormwater Associated With Industrial Activities	Northeast Lamp Recycling, Inc.	132
East Windsor	F & G Realty Llc	GSI000109	Stormwater Associated With Industrial Activities	F & G Realty Recycle Center	141
East Windsor	215 South Main Assoc., Ltd Partnership	GSI000539	Stormwater Associated With Industrial Activities	Mercury Excelum, Inc.	119

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
East Windsor	Town Of East Windsor	GSI002021	Stormwater Associated With Industrial Activities	Town Of East Windsor Wpcf	129
East Windsor	Usa Hauling And Recycling, Inc.	GSI002050	Stormwater Associated With Industrial Activities	Usa Hauling & Recycling, Incorporated	143
East Windsor	Town Of East Windsor	GSM000053	Part B Municipal Stormwater MS4	East Windsor, Town Of	NA
Enfield	Town Of Enfield	CT0100200	Surface Water Permit	Enfield Wpcf	152
Enfield	Abf Freight System, Inc.	GSI000110	Stormwater Associated With Industrial Activities	Abf Freight System, Inc.	146
Enfield	Pti Industries, Inc.	GSI002153	Stormwater Associated With Industrial Activities	Pti Industries, Inc.	154
Enfield	Town Of Enfield	GSM000086	Part B Municipal Stormwater MS4	Enfield, Town Of	N/A
Glastonbury	Seaboard Marina, Inc.	GSI002169	Stormwater Associated With Industrial Activities	Seaboard Marina	54
Glastonbury	Town Of Glastonbury	GSM000057	Part B Municipal Stormwater MS4	Glastonbury, Town Of	N/A
Haddam	State Of Connecticut Department Of Transportation	GSI000029	Stormwater Associated With Industrial Activities	Haddam Maintenance Facility	25
Haddam	Town Of Haddam	GSI001487	Stormwater Associated With Industrial Activities	Haddam Transfer Station	28
Hartford	Connecticut Resource Recovery Authority	CT0003875	Surface Water Permit	Crra Mid-Conn Facility	72
Hartford	Connecticut Resource Recovery Authority	CT0003875	Surface Water Permit	Ct Resources Recovery Auth	75
Hartford	Stone Depot, Inc.	GSC000232	Stormwater Discharge Associated With Commercial Activity	Stone Depot, Inc.	62
Hartford	Flatbush Charter Partners, Llc	GSC000248	Stormwater Discharge Associated With Commercial Activity	Charter Oak Market Place	86
Hartford	Carmax Auto Superstore Inc	GSC000312	Stormwater Discharge Associated With Commercial Activity	Carmax #7286	94
Hartford	Bertera Auto Group, Bertera Subaru Of Hartford Inc.	GSC000374	Stormwater Discharge Associated With Commercial Activity	Bertera Subaru Of Hartford Inc.	95
Hartford	Connecticut Resource Recovery Authority	GSI000118	Stormwater Associated With Industrial Activities	Mid-Ct Resource Recovery Facility	71
Hartford	The Metropolitan District	GSI000490	Stormwater Associated With Industrial Activities	Mdc-Vehicle Maintenance Facility	68

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Hartford	Connecticut Resource Recovery Authority	GSI000500	Stormwater Associated With Industrial Activities	C R R A / Hartford Landfill	96
Hartford	H.N.S. Management Co.	GSI000696	Stormwater Associated With Industrial Activities	Connecticut Transit	90
Hartford	Connecticut Resource Recovery Authority	GSI000814	Stormwater Associated With Industrial Activities	Crra Regional Recycling Facility	63
Hartford	State Of Connecticut Department Of Transportation	GSI000915	Stormwater Associated With Industrial Activities	Brainard Airport	70
Hartford	State Of Connecticut Department Of Transportation	GSI000956	Stormwater Associated With Industrial Activities	Hartford Maintenance Facility	91
Hartford	Auto Parts Depot, Inc	GSI001169	Stormwater Associated With Industrial Activities	Auto Parts Depot, Inc.	92
Hartford	Demilo & Company	GSI001438	Stormwater Associated With Industrial Activities	Demilo & Company, Inc.	89
Hartford	All Waste, Inc.	GSI001518	Stormwater Associated With Industrial Activities	All Waste Incorporated	66
Hartford	Murphy Road Recycling, Llc	GSI001525	Stormwater Associated With Industrial Activities	Murphy Road Recycling Llc	65
Hartford	Russo Brothers, Incorporated	GSI001572	Stormwater Associated With Industrial Activities	Russo Brothers, Inc.	102
Hartford	United States Postal Service	GSI002012	Stormwater Associated With Industrial Activities	United States Postal Service Hartford Vmf	93
Hartford	Murphy Road Recycling, Llc	GSI002048	Stormwater Associated With Industrial Activities	Murphy Road Recycling Llc	64
Hartford	Heritage-Crystal Clean, Llc	GSI002117	Stormwater Associated With Industrial Activities	Heritage-Crystal Clean Llc, Hartford Branch	67
Hartford	Charter Oak Used Auto Parts Inc	GSI002187	Stormwater Associated With Industrial Activities	Charter Oak Used Auto Parts, Inc.	88
Hartford	Metal Management Aerospace, Inc.	GSI002206	Stormwater Associated With Industrial Activities	Metal Management Aerospace, Inc	100
Hartford	Dattco, Inc.	GSI002268	Stormwater Associated With Industrial Activities	Dattco, Inc.	99
Hartford	City Of Hartford	GSM000062	Part B Municipal Stormwater MS4	Hartford, City Of	85
Hartford	Connecticut Resource Recovery Authority	GSN001663	Stormwater Registration - Construction Activities >10 Acres	C R R A / Hartford Landfill	97
Hartford	City Of Hartford	GSN001774	Stormwater Registration - Construction Activities 5-10 Acres	Kevin D. Anderson Recreational Center	98

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Hartford	Kbe Building Corporation	GSN002155	Stormwater Registration - Construction Activities 5-10 Acres	Nelton Court	77
Hartford	City Auto Parts, Incorporated	GSI002239	Stormwater Associated With Industrial Activities	City Auto Parts, Inc.	101
Middletown	United Technologies Corporation	CT0001406	Surface Water Permit	Pratt & Whitney Middletown	30
Middletown	City Of Middletown	CT0100323	Surface Water Permit	Middletown Wpcf	32
Middletown	United Technologies Corporation	GSI000126	Stormwater Associated With Industrial Activities	Pratt & Whitney Middletown	29
Middletown	City Of Middletown	GSI002084	Stormwater Associated With Industrial Activities	Middletown Wpcf	31
Middletown	Kleen Energy Systems, Llc	GSI002393	Stormwater Associated With Industrial Activities	Kleen Energy Systems, Llc	33
Middletown	City of Middletown	GSM000011	Part B Municipal Stormwater MS4	Middletown, City Of	N/A
Middletown	O & G Industries, Inc.	GSN001754	Stormwater Registration - Construction Activities >10 Acres	Kleen Energy Systems, Llc	34
Portland	Town Of Portland	CT0101150	Surface Water Permit	Town Of Portland Wpcf	42
Portland	Triram Connecticut, L.L.C.	GSI000147	Stormwater Associated With Industrial Activities	Triram Connecticut, L.L.C	46
Portland	Portland Boat Works, Incorporated	GSI000270	Stormwater Associated With Industrial Activities	Portland Boat Works, Inc.	36
Portland	William J. Petzold, Incorporated	GSI000398	Stormwater Associated With Industrial Activities	Petzold's Marine Center	47
Portland	Yankee Boat Yard & Marina, Inc.	GSI000423	Stormwater Associated With Industrial Activities	Yankee Boat Yard & Marina, Inc.	35
Portland	Airex Rubber Products Corporation	GSI000979	Stormwater Associated With Industrial Activities	Airex Rubber Products Corp.	48
Portland	Town Of Portland	GSI001107	Stormwater Associated With Industrial Activities	Portland Transfer Station	45
Portland	Airline Avenue Recycling Inc	GSI001946	Stormwater Associated With Industrial Activities	Airline Avenue Recycling, Llc	40
Portland	Safety-Kleen Systems, Inc	GSI002045	Stormwater Associated With Industrial Activities	Safety-Kleen Systems, Inc.	43
Portland	B & B Petroleum Inc.	GSI002051	Stormwater Associated With Industrial Activities	Prospect Group, Llc	44
Portland	Town Of Portland	GSI002129	Stormwater Associated With Industrial Activities	Town Of Portland Wpcf	41

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Portland	Town Of Portland	GSM000005	Part B Municipal Stormwater MS4	Portland, Town Of	N/A
Rocky Hill	State Of Connecticut Department Of Transportation	GSI000058	Stormwater Associated With Industrial Activities	Rocky Hill Stores & Salt Storage Facility	52
Rocky Hill	Citgo Petroleum Corporation	GSI000150	Stormwater Associated With Industrial Activities	Citgo Petroleum Corporation	57
Rocky Hill	C. White & Son, Inc.	GSI000460	Stormwater Associated With Industrial Activities	C. White & Son, Inc.	55
Rocky Hill	Town Of Rocky Hill	GSI001312	Stormwater Associated With Industrial Activities	Rocky Hill Highway Garage	53
Rocky Hill	State Of Connecticut Department Of Transportation	GSI002358	Stormwater Associated With Industrial Activities	Rocky Hill Ferry Dock	58
Rocky Hill	Town Of Rocky Hill	GSM000016	Part B Municipal Stormwater MS4	Rocky Hill, Town Of	N/A
Rocky Hill	The Whiting-Turner Contracting Co	GSN002104	Stormwater Registration - Construction Activities >10 Acres	New Public Laboratory	56
South Windsor	Barker Steel, Llc	GSI002257	Stormwater Associated With Industrial Activities	Barker Steel Company, Inc.	107
South Glastonbury	Town Of Glastonbury	GSI000606	Stormwater Associated With Industrial Activities	Bulky Waste Landfill	51
South Windsor	Town Of South Windsor	CT0100510	Surface Water Permit	South Windsor Sewage Treatment	106
South Windsor	Town Of South Windsor	GSI000176	Stormwater Associated With Industrial Activities	South Windsor Public Works Garage	26
South Windsor	Metals Testing Company	GSI000316	Stormwater Associated With Industrial Activities	Metals Testing Company, Inc.	118
South Windsor	Redland Brick Inc.	GSI000545	Stormwater Associated With Industrial Activities	Redland Brick, Inc. - K.F. Plant	117
South Windsor	Electro-Methods, Inc.	GSI001095	Stormwater Associated With Industrial Activities	Electro-Methods, Inc.	110
South Windsor	Electro-Methods, Inc.	GSI001104	Stormwater Associated With Industrial Activities	Electro-Methods, Inc.	112
South Windsor	Utc Power Corp.	GSI001410	Stormwater Associated With Industrial Activities	Utc Power Corp	109
South Windsor	O & W Heat Treat Inc	GSI001757	Stormwater Associated With Industrial Activities	O & W Heat Treat	108
South Windsor	Rolling Frito-Lay Sales, Lp	GSI001769	Stormwater Associated With Industrial Activities	Rolling Frito-Lay Sales, Lp	105

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
South Windsor	First Student, Inc.	GSI001889	Stormwater Associated With Industrial Activities	First Student Inc.	116
South Windsor	Murphy Road Recycling, Llc	GSI001984	Stormwater Associated With Industrial Activities	Nutmeg Road Recycling	115
South Windsor	G & S Scrap Metal	GSI002183	Stormwater Associated With Industrial Activities	G & S Scrap Metal	111
South Windsor	Keystone Paper & Box Co., Inc.	GSI002426	Stormwater Associated With Industrial Activities	Keystone Paper And Box Company, Inc.	112
South Windsor	Town Of South Windsor	GSM000081	Part B Municipal Stormwater MS4	South Windsor, Town Of	N/A
Suffield	Town Of Suffield	CT0100552	Surface Water Permit	Suffield Sewage Treatment	103
Suffield	Praxair, Inc.	GSI000322	Stormwater Associated With Industrial Activities	Praxair Inc.	150
Suffield	Fleming's Transportation, Inc.	GSI000649	Stormwater Associated With Industrial Activities	Fleming's Transportation Inc.	153
Suffield	Babylon Recycling Center, Llc	GSI001875	Stormwater Associated With Industrial Activities	Babylon Recycling Center, Llc	147
Suffield	C & S Wholesale Grocers	GSI002083	Stormwater Associated With Industrial Activities	C & S Wholesale Grocers	149
Suffield	Hp Hood Llc	GSI002221	Stormwater Associated With Industrial Activities	Hp Hood Llc	148
Suffield	Town Of Suffield	GSM000015	Part B Municipal Stormwater MS4	Suffield, Town Of	N/A
Wethersfield	Town Of Wethersfield	GSM000031	Part B Municipal Stormwater MS4	Wethersfield, Town Of	N/A
Wethersfield	Town Of Wethersfield	GSI001214	Stormwater Associated With Industrial Activities	Wethersfield Transfer Station	59
Wethersfield	Global Companies, Llc	GSI001752	Stormwater Associated With Industrial Activities	Global Companies Llc	60
Wethersfield	Buckeye Terminals, Llc	GSI002089	Stormwater Associated With Industrial Activities	Buckeye Terminals, Llc-Wethersfield Termin	61
Windsor	Target Stores, Inc.	GSC000340	Stormwater Discharge Associated With Commercial Activity	Target Store T2213 Windsor	121
Windsor	Stanadyne Corporation	GSI000170	Stormwater Associated With Industrial Activities	Stanadyne Corporation	104
Windsor	The Taylor & Fenn Company	GSI000552	Stormwater Associated With Industrial Activities	The Taylor & Fenn Company	103

Table 5: Permitted facilities within the Connecticut River watershed (continued)

Town	Client	Permit ID	Permit Type	Site Name/Address	Map #
Windsor	Cooper Crouse-Hinds	GSI001683	Stormwater Associated With Industrial Activities	Crouse-Hinds Airport Lighting Products	125
Windsor	Town Of Windsor Locks	GSM000066	Part B Municipal Stormwater MS4	Windsor, Town Of	N/A
Windsor Locks	Ahlstrom Nonwovens Llc	CT0000434	Surface Water Permit	Ahlstrom Nonwovens Llc	140
Windsor Locks	Algonquin Power Windsor Locks Llc	CT0026476	Surface Water Permit	Algonquin Power Windsor Locks	134
Windsor Locks	Town Of Windsor Locks	CT0101591	Surface Water Permit	Windsor Locks Wpcf	127
Windsor Locks	Connecticut Army National Guard	GSI000281	Stormwater Associated With Industrial Activities	Army Aviation Support Facility	138
Windsor Locks	Ups Cartage Services, Inc	GSI000324	Stormwater Associated With Industrial Activities	Ups Cartage Services, Inc. - 159	145
Windsor Locks	Federal Express Corporation	GSI001250	Stormwater Associated With Industrial Activities	Federal Express Corporation	123
Windsor Locks	Ahlstrom Nonwovens Llc	GSI001383	Stormwater Associated With Industrial Activities	Ahlstrom Specialty Processing Center	144
Windsor Locks	Ahlstrom Nonwovens Llc	GSI001384	Stormwater Associated With Industrial Activities	Ahlstrom Nonwovens Llc	139
Windsor Locks	FedEx National Ltl, Inc.	GSI001960	Stormwater Associated With Industrial Activities	FedEx National Ltl, Inc. - (Hrt)	124
Windsor Locks	Town Of Windsor Locks	GSI001963	Stormwater Associated With Industrial Activities	Windsor Locks Wpcf	126
Windsor Locks	Town Of Windsor Locks	GSM000010	Part B Municipal Stormwater MS4	Windsor Locks, Town Of	136
Windsor Locks	Travelers Aviation	GSN001742	Stormwater Registration - Construction Activities 5-10 Acres	Traveler's Hangar Expansion	137
Windsor Locks	M & L Development Corporation	GSN002057	Stormwater Registration - Construction Activities 5-10 Acres	Property At Oak Ridge Drive	122

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNTC = To Numerous To Count)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
East Haddam	East Haddam DPW	GSI1386	Connecticut River	1	04/25/02	10
East Haddam	East Haddam DPW	GSI1386	Connecticut River	2	04/25/02	10
East Hampton	Connecticut Yankee Atomic Power Plant	GSI1377	Connecticut River	SW-1	07/26/01	>600
East Hampton	Connecticut Yankee Atomic Power Plant	GSI1377	Connecticut River	SW-1	04/22/02	150
East Hampton	Connecticut Yankee Atomic Power Plant	GSI1377	Connecticut River	SW-1	05/01/03	10
East Hampton	Connecticut Yankee Atomic Power Plant	GSI1377	Connecticut River	SW-4	07/26/01	>600
East Hampton	Connecticut Yankee Atomic Power Plant	GSI1377	Connecticut River	SW-4	04/22/02	120
East Hampton	CT Yankee Atomic Power Plant	GSI1377	Connecticut River	SW-4	05/01/03	22
East Hartford	Motiva Enterprises	GSI1230	Connecticut River	outfall #1	09/14/01	170
East Hartford	Motiva Enterprises	GSI1230	Connecticut River	outfall #1	03/26/02	10
East Hartford	Connecticut Natural Gas Corp	GSI1506	Connecticut River	001	09/25/01	>1000
East Hartford	Connecticut Natural Gas Corp	GSI1506	Connecticut River	001	09/23/02	50
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 010	07/26/01	50
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 010	08/20/02	50
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 011	07/26/01	300
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 011C	08/20/02	50
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 012	07/26/01	1,000
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 012	08/20/02	6,000
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 015	07/11/01	400

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNTC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
East Hartford	Pratt & Whitney	GSI660	Connecticut River	SWMP 015	08/20/02	800
East Hartford	Arrow/Coach USA	GSI689	Connecticut River	1	03/26/02	10
East Hartford	Arrow/Coach USA	GSI689	Connecticut River	001	07/23/02	240
East Hartford	Arrow/Coach USA	GSI689	Connecticut River	2	03/26/02	10
East Hartford	Arrow/Coach USA	GSI689	Connecticut River	002	07/23/02	130
East Windsor	Wood Group Aero	GSI1333	Connecticut River	68 prospect road	11/20/01	70
East Windsor	Wood Group Aero	GSI1333	Connecticut River	66 prospect hill road site	11/06/02	300
East Windsor	Wood Group Fuel Systems	GSI1361	Connecticut River	66 prospect hill road site	12/18/01	10
East Windsor	Wood Group Fuel Systems	GSI1361	Connecticut River	66 prospect hill road site	10/16/02	100
East Windsor	Wood Group Fuel Systems	GSI1361	Connecticut River	66 prospect hill road site	07/22/03	>2000
East Windsor	Wood Group Fuel Systems	GSI1361	Connecticut River	SE corner of parking area	09/15/00	10
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	01	10/05/00	200
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	01	08/31/01	>600
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	02	10/05/00	330
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	02	08/31/01	>600
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	03	10/05/00	10
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	03	07/26/01	10
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	03	08/31/01	>600
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	DSN-001	09/26/02	>2000
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	DSN-002	09/26/02	1,700
East Windsor	Engelhard Corporation	GSI1433	Connecticut River	DSN-003	09/26/02	10

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNTC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
East Windsor	Mercury Exelum	GSI539	Connecticut River	north lot	09/26/02	200
East Windsor	Mercury Exelum	GSI539	Connecticut River	South lot	04/28/02	100
East Windsor	Mercury Exelum	GSI539	Connecticut River	south lot	09/26/02	2,900
Enfield	Qubecor World/Infinity Graphics	GSI1063	CT River Basin	SW3-truck well	09/26/02	3,600
Enfield	ABF Freight System	GSI110	Connecticut River	SD	09/14/01	170
Hartford	United States Postal Service	GSI1064	Connecticut River	SW-1	07/26/01	10
Hartford	United States Postal Service	GSI1064	Connecticut River	SW-1	04/04/02	100
Hartford	DeMilo & Company	GSI1438	Connecticut River	001	09/26/02	1,700
Hartford	DeMilo & Company	GSI1438	Connecticut River	A-CB @ leibert road	09/14/01	300
Hartford	All Waste	GSI1518	Connecticut River	001	09/15/02	>2000
Hartford	Covanta Mid-CT	GSI1532	Connecticut River	South Meadow Station DSN 007	08/29/02	>600
Hartford	Covanta Mid-CT	GSI1532	Connecticut River	South Meadow Station-DSN 007	09/10/01	>6000
Hartford	Coastal Technology	GSI231	Connecticut River	002	10/15/01	100
Hartford	Coastal Technology	GSI231	Connecticut River	003	10/15/01	100
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	001	09/10/01	>6000
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	001	11/06/02	1,100
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	002	09/10/01	6,000
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	002	11/06/02	>6000
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	003	09/10/01	>6000
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	003	11/06/02	1,100
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	002A	09/10/01	6,000
Hartford	CRRA-Hartford Landfill	GSI500	Connecticut River	002A	11/06/02	180
Hartford	Shepard Steel	GSI555	Connecticut River		12/18/01	8
Hartford	Shepard Steel	GSI555	Connecticut River		05/23/03	4
Hartford	The Metropolitan District	GSI597	CT River Basin	002S	11/20/01	500

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNTC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Hartford	The Metropolitan District	GSI597	Connecticut River	002S	11/16/02	1,200
Hartford	The Metropolitan District	GSI597	CT River Basin	004S	11/20/01	100
Hartford	The Metropolitan District	GSI597	Connecticut River	004S	11/16/02	4,200
Hartford	The Metropolitan District	GSI597	CT River Basin	006S	11/20/01	1,400
Hartford	The Metropolitan District	GSI597	Connecticut River	006S	11/16/02	1,600
Hartford	Connecticut Transit	GSI696	Connecticut River	001	06/11/01	10
Hartford	Connecticut Transit	GSI696	Connecticut River	002	06/11/01	10
Hartford	Connecticut Transit	GSI696	Connecticut River	002	10/11/02	>2000
Hartford	CT DOT Brainard Airport	GSI915	Connecticut River	B	07/23/02	1,200
Hartford	CT DOT Brainard Airport	GSI915	Connecticut River	D	07/23/02	1,400
Hartford	CTDOT Brainard Airport	GSI915	Connecticut River	DSN-B	11/20/01	150
Hartford	CTDOT Brainard Airport	GSI915	Connecticut River	DSN-D	11/20/01	>600
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-001	08/10/01	350
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-002	08/10/01	6,300
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-003	08/13/01	600
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-004	08/10/01	850
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-006	08/10/01	7,200
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-007	08/20/01	37,000
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-008	08/20/01	1,700
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-009	08/10/01	5,600
Middletown	United Technologies - Pratt & Whitney	GSI126	Connecticut River	D-010	08/10/01	8,800
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN001	06/14/02	50
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN002	07/23/02	4,400
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN003	06/14/02	350
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN004	06/14/02	250
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN006	07/24/02	5,400
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN007	06/14/02	1,000
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN008	06/14/02	400

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN009	07/24/02	4,800
Middletown	Pratt & Whitney	GSI126	Connecticut River	DSN010	06/14/02	>10000
Middletown	NRG Middletown	GSI1428	Connecticut River	004-1	05/13/02	10
Middletown	NRG Middletown	GSI1428	Connecticut River	013-1	05/28/02	>600
Middletown	NRG Middletown	GSI1428	Connecticut River	017-1	05/13/02	340
Middletown	NRG Middletown	GSI1428	Connecticut River	018-A	05/28/02	10
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 004-1	05/28/02	10
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 004-1	06/12/03	80
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 006-1	09/26/02	30
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 006-1	06/12/03	420
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 013-1	06/05/02	10
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 013-1	06/13/03	600
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 017-1	09/26/02	20
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 017-1	06/13/03	660
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 018-1	06/05/02	10
Middletown	NRG Middletown	GSI1428	Connecticut River	DSN 018-A	06/12/03	20
Portland	Waste Management N.E.E.T.	GSI1311	Connecticut River	1	05/28/02	10
Portland	Waste Management N.E.E.T.	GSI1311	Connecticut River	1	09/19/03	9,900
Portland	Waste Management N.E.E.T.	GSI1311	Connecticut River	CB @ corner of property	09/25/01	1,800
Portland	United Oil Recovery	GSI1389	Connecticut River	o/w separator	09/25/01	900
Portland	United Oil Recovery	GSI1389	Connecticut River	Oil/H2O sep	09/26/02	2,900
Portland	Portland Boat Works	GSI270	Connecticut River		09/14/01	10
Portland	Portland Boat Works Inc.	GSI270	Connecticut River		09/27/02	>2000
Portland	Petzold	GSI398	Connecticut River		12/18/01	80
Portland	Petzold	GSI398	Connecticut River		11/12/02	>600
Portland	Tilcon Connecticut	GSI584	Connecticut River	Portland 001	05/22/01	4
Portland	Tilcon Connecticut	GSI584	Connecticut River	Portland 001	08/29/02	48
Portland	Tilcon Connecticut	GSI584	Connecticut River	Portland 001	05/01/03	0
Portland	Stone Container Corp	GSI877	Connecticut River	DSN 001	09/14/01	>600
Portland	Stone Container Corp	GSI877	Connecticut River	DSN 003	09/14/01	10
Portland	Stone Container Corp	GSI877	Connecticut River	DSN 004	09/14/01	10

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Portland	Stone Container Corp	GSI877	Connecticut River	DSN001	09/15/02	>600
Portland	Stone Container Corp	GSI877	Connecticut River	DSN002	09/15/02	>600
Portland	Stone Container Corp	GSI877	Connecticut River	DSN004	09/15/02	>600
Rocky Hill	C.White & Son	GSI460	Connecticut River	CB-1	03/26/02	1,225
Rocky Hill	C.White & Son	GSI460	Connecticut River	CB-1	08/20/02	1,200
South Windsor	Waste Management of Connecticut	GSI1121	Connecticut River	Detention Pond	03/26/02	>600
South Windsor	Waste Management of Connecticut	GSI1121	Connecticut River	Detention Pond	04/25/02	4,000
South Windsor	Metals Testing Company	GSI316	Connecticut River	1	04/10/02	10
South Windsor	Metals Testing Company	GSI316	Connecticut River	DSN 001	05/08/03	10
South Windsor	Neyra Industries	GSI485	Connecticut River		09/27/02	>2000
South Windsor	Mestek Inc.	GSI526	Connecticut River	RD West	07/09/02	10
South Windsor	Mestek Inc.	GSI526	Connecticut River	Yard Drain	07/09/02	>600
Suffield	Wood Group Component Repair	GSI1385	Connecticut River	DSN001	09/19/00	10
Suffield	Wood Group Component Repair	GSI1385	Connecticut River	DSN-001	07/19/02	>600
Suffield	Wood Group Component Repair	GSI1385	Connecticut River	DSN-001 (CB)	09/26/02	200
Wethersfield	Town of Wethersfield/Municipal PW Garage	GSI1214	Connecticut River	1	05/12/02	>600
Wethersfield	Town of Wethersfield/Municipal PW Garage	GSI1214	Connecticut River	001	06/18/03	>1000
Wethersfield	Amerada Hess Corp.	GSI619	Connecticut River	4510-outflow	04/01/02	10
Wethersfield	Amerada Hess Corp.	GSI619	Connecticut River	4510-outflow	06/12/03	100
Wethersfield	Amerada Hess Corp.	GSI619	Connecticut River	lagoon	04/01/02	10
Wethersfield	Amerada Hess Corp.	GSI619	Connecticut River	lagoon	06/12/03	100
Wethersfield	Amerada Hess Corp.	GSI619	Connecticut River	tank field outfall	08/13/01	TNTC

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Wethersfield	Amerada Hess Corp.	GSI619	Connecticut River	upper lagoon discharge	09/21/01	100
Wethersfield	Northeast Petroleum-div of Cargill	GSI687	Connecticut River	Outfall 001(WETH-1)	07/24/02	>1,500
Wethersfield	Northeast Petroleum Div of Cargill	GSI687	Connecticut River	Outfall 1 (NEPW-1)	08/20/01	100
Windsor	Taylor & Fenn Company	GSI552	Connecticut River	001	09/21/01	2,400
Windsor Locks	FedEx	GSI1250	CT River watershed	CB @ SW side upstream of dis 002	10/16/02	10
Windsor Locks	FedEx (EHTA) East Hartford Facility	GSI1250	CT River watershed	CB @ SW side upstream of dis 002	09/19/03	350
Windsor Locks	Federal Express (EHTA) East Hartford Facility	GSI1250	CT River watershed	CB @ SW side upstream of dis 002	11/02/06	200
Windsor Locks	Federal Express (EHTA) East Hartford Facility	GSI1250	CT River watershed	CB @ SW side upstream of dis 002	01/09/08	40
Windsor Locks	FedEx	GSI1250	CT River watershed	CB SW side upstream of 002	11/29/01	15,000
Windsor Locks	Wood Group Pratt & Whitney	GSI1314	Connecticut River	001	09/25/01	>600
Windsor Locks	Ahlstrom Dexter	GSI1383	Connecticut River	SPC	06/18/03	4,100
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	011R	05/22/01	210
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	011R	06/12/02	10
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	011R	06/18/03	300
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	017R	05/22/01	60
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	017R	06/12/02	40
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	017R	07/09/03	1,200
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	C1	06/18/03	1,200
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	C-1	04/25/02	20
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	C-1	05/10/02	30
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	Cogen	07/15/02	40
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	cogen	07/09/03	0
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	E1	05/22/01	>6000

Table 6: Industrial permits in the Connecticut River watershed and available fecal coliform data (colonies/100mL). The results cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (TNC = To Numerous To Count) (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Windsor Locks	Ahlstrom Dexter LLC	GSI1384	Connecticut River	E1	07/09/02	>600
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	E1	06/18/03	2,700
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	J1	05/22/01	10
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	J1	08/29/02	>600
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	J1	06/18/03	400
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	N2	06/12/02	270
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	N2	07/09/03	400
Windsor Locks	Ahlstrom Dexter	GSI1384	Connecticut River	N-2	05/22/01	>6000
Windsor Locks	CNF,Inc	GSI324	Connecticut River	001	08/14/01	200
Windsor Locks	CNF,Inc	GSI324	Connecticut River	1	06/05/02	100
Windsor Locks	CNF,Inc-Menlo Worldwide Forwarding	GSI324	Connecticut River	001	07/09/03	1,100

Municipal Stormwater Permitted Sources

Per the EPA Phase II Stormwater rule all municipal storm sewer systems (MS4s) operators located within US Census Bureau Urbanized Areas (UAs) must be covered under MS4 permits regulated by the appropriate State agency. There is an EPA waiver process that municipalities can apply for to not participate in the MS4 program. In Connecticut, EPA has granted such waivers to 19 municipalities. All participating municipalities within UAs in Connecticut are currently regulated under MS4 permits by CT DEEP staff in the MS4 program.

The US Census Bureau defines a UA as a densely settled area that has a census population of at least 50,000. A UA generally consists of a geographic core of block groups or blocks that exceeds the 50,000 people threshold and has a population density of at least 1,000 people per square mile. The UA will also include adjacent block groups and blocks with at least 500 people per square mile. A UA consists of all or part of one or more incorporated places and/or census designated places, and may include additional territory outside of any place. (67 FR 11663)

For the 2000 Census a new geographic entity was created to supplement the UA blocks of land. This created a block known as an Urban Cluster (UC) and is slightly different than the UA. The definition of a UC is a densely settled area that has a census population of 2,500 to 49,999. A UC generally consists of a geographic core of block groups or blocks that have a population density of at least 1,000 people per square mile, and adjacent block groups and blocks with at least 500 people per square mile. A UC consists of all or part of one or more incorporated places and/or census designated places; such a place(s) together with adjacent territory; or territory outside of any place. The major difference is the total population cap of 49,999 people for a UC compared to >50,000 people for a UA. (67 FR 11663)

While it is possible that CT DEEP will be expanding the reach of the MS4 program to include UC municipalities in the near future they are not currently under the permit. However, the GIS layers used to

create the MS4 maps in this Statewide TMDL did include both UA and UC blocks. This factor creates some municipalities that appear to be within an MS4 program that are not currently regulated through an MS4 permit. This oversight can explain a municipality that is at least partially shaded grey in the maps and there are no active MS4 reporting materials or information included in the appropriate appendix. While these areas are not technically in the MS4 permit program, they are still considered urban by the cluster definition above and are likely to contribute similar stormwater discharges to affected waterbodies covered in this TMDL.

As previously noted, EPA can grant a waiver to a municipality to preclude their inclusion in the MS4 permit program. One reason a waiver could be granted is a municipality with a total population less than 1000 people, even if the municipality was located in a UA. There are 19 municipalities in Connecticut that have received waivers, this list is: Andover, Bozrah, Canterbury, Coventry, East Hampton, Franklin, Haddam, Killingworth, Litchfield, Lyme, New Hartford, Plainfield, Preston, Salem, Sherman, Sprague, Stafford, Washington, and Woodstock. There will be no MS4 reporting documents from these towns even if they are displayed in an MS4 area in the maps of this document.

The list of US Census UCs is defined by geographic regions and is named for those regions, not necessarily by following municipal borders. In Connecticut the list of UCs includes blocks in the following Census Bureau regions: Colchester, Danielson, Lake Pocotopaug, Plainfield, Stafford, Storrs, Torrington, Willimantic, Winsted, and the border area with Westerly, RI (67 FR 11663). Any MS4 maps showing these municipalities may show grey areas that are not currently regulated by the CT DEEP MS4 permit program.

The Connecticut River watershed is located within 18 municipalities throughout central Connecticut. Within the watershed area, there are 15 municipalities that have designated urban areas, as defined by the U.S. Census Bureau, and are required to comply with the General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4 permit) issued by the Connecticut Department of Energy and Environmental Protection (DEEP) (Figure 9). Those municipalities are Suffield, Enfield, Windsor, Windsor Locks, South Windsor, East Windsor, Hartford, East Hartford, Wethersfield, Glastonbury, Rocky Hill, Cromwell, Portland, Middletown, and Chester. This general permit is only applicable to municipalities that are identified in Appendix A of the MS4 permit that contain designated urban areas and discharge stormwater via a separate storm sewer system to surface waters of the State. The permit requires municipalities to develop a Stormwater Management Plan (SMP) to reduce the discharge of pollutants as well as to protect water quality. The MS4 permit is discussed further in the "TMDL Implementation Guidance" section of the core TMDL document. Additional information regarding stormwater management and the MS4 permit can be obtained on CTDEEP's website (http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325702&depNav_GID=1654).

Multiple MS4 outfalls have been sampled for *E. coli* bacteria in the watershed between 2004 and 2009 (Table 7). Sampling occurred at MS4 outfalls in Chester, Cromwell, East Windsor, Hartford, Portland, and Suffield. Chester had one outfall sampled six times, and the single sample water quality standard (WQS) of 410 colonies/100 mL was exceeded on three of the six (50%) sample dates. Cromwell had one outfall sampled four times, and the single sample WQS was exceeded on two of the four (50%) sample dates. East Windsor had two outfalls sampled three times, and none of the samples exceeded the single sample WQS. Hartford had two outfalls sampled two times, and every sample (100%) exceeded the single sample WQS. Portland had six outfalls sampled 25 times, and 14 of the 25 (56%) samples exceeded the single sample WQS. Suffield had three outfalls sampled 10 times, and three out of the 10 (33%) samples exceeded the single sample WQS.

Table 7: List of MS4 sample locations and *E. coli* (colonies/100 mL) results in the Connecticut River watershed

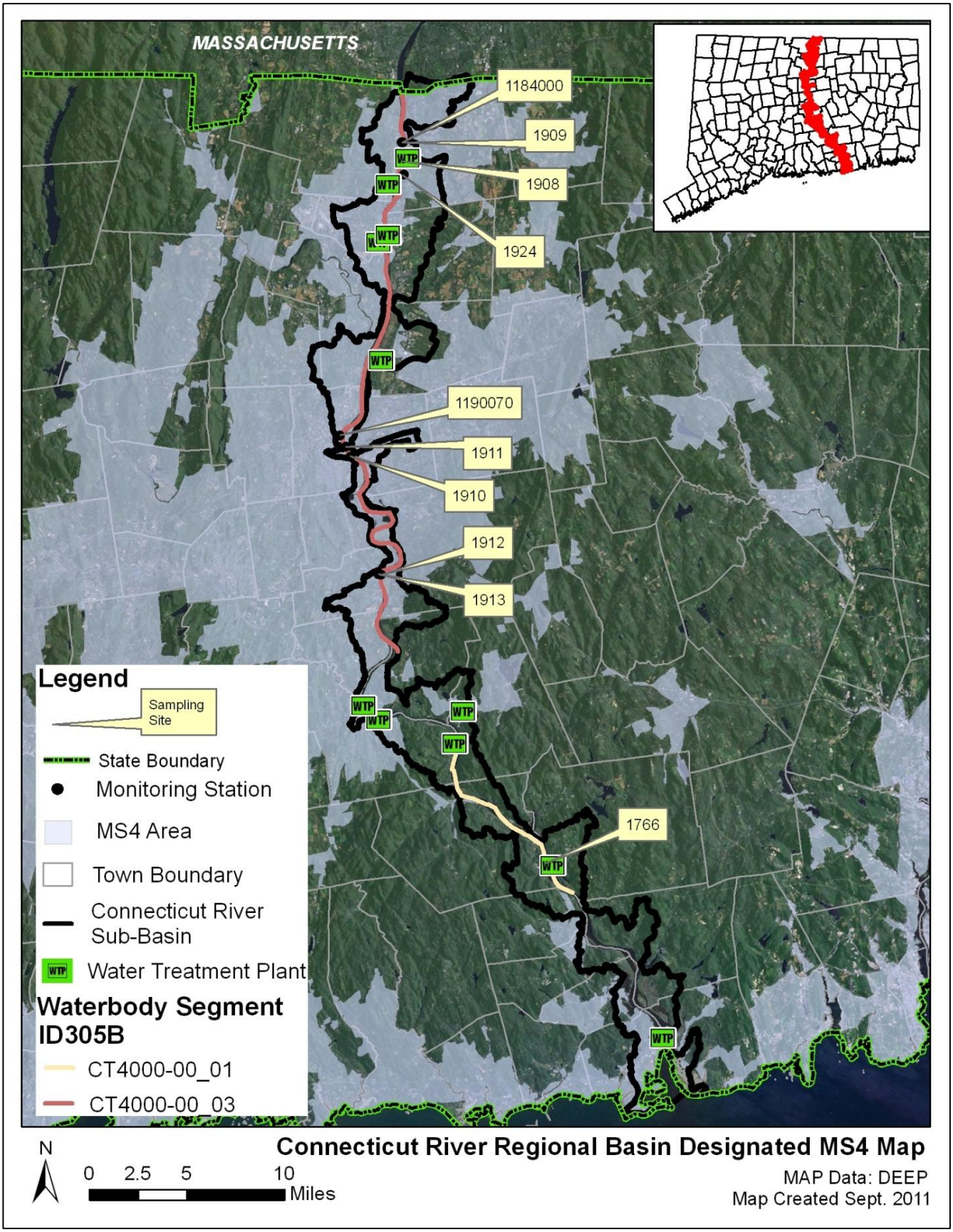
Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Chester	R1-High Field Lane (41°25'21"N 72°27'29"W) residential neighborhood	Residential	CT River	12/07/04	7
Chester	R1-High Field Lane (41°25'21"N 72°27'29"W) residential neighborhood	Residential	CT River	11/30/05	80
Chester	R1-High Field Lane (41°25'21"N 72°27'29"W) residential neighborhood	Residential	CT River	12/01/06	20
Chester	R1-High Field Lane (41°25'21"N 72°27'29"W) residential neighborhood	Residential	CT River	09/11/07	>2000
Chester	R1-High Field Lane (41°25'21"N 72°27'29"W) residential neighborhood	Residential	CT River	06/09/09	24,200
Chester	R1-High Field Lane (41°25'21"N 72°27'29"W) residential neighborhood	Residential	CT River	10/07/09	17,330
Cromwell	1027480/779860 Easting/Northing New Lane	Commercial	CT River	11/09/05	2,500
Cromwell	1027480/779860 Easting/Northing New Lane	Commercial	CT River	07/11/06	250
Cromwell	1027480/779860 Easting/Northing New Lane	Commercial	CT River	07/18/07	0
Cromwell	1027480/779860 Easting/Northing New Lane	Commercial	CT River	06/29/08	800
East Windsor	C-1 South side of Newberry Rd in front of RR Tool & Die, east outfall	Commercial	CT River	05/02/06	100
East Windsor	C-2 South side of Newberry Rd in front of RR Tool & Die, south outfall	Commercial	CT River	05/02/06	50
East Windsor	R2-W side of intersection of Spring St & Water St, outfall approx 1/2 way down rip-rap slope	Residential	CT River	05/02/06	220
Hartford	HAR-2/Gully Brook S of Tower Ave 41 47'59"N/72 41'23"W	Residential	CT River	11/12/04	900
Hartford	HTFD 6 Leibert Rd N 41^{O} 46' 57" W 72^{O} 39' 33"	Industrial	CT River	09/11/09	7,500
Portland	C1 behind country mrkt to Quarry	Commercial	CT River	11/30/05	0
Portland	C1 RT 17A rear of Country Market	Commercial	CT River	01/05/07	0
Portland	C1 RT 17A rear of Country Market	Commercial	CT River	01/09/08	1,200
Portland	C1 RT 17A rear of Country Market	Commercial	CT River	09/11/09	1,900
Portland	C1 RT 17A rear of Country Market	Commercial	CT River	11/20/09	2,900
Portland	C2 Tuccitto Rd	Commercial	CT River	11/30/05	0
Portland	C2 Tuccitto Rd	Commercial	CT River	01/05/07	0

Table 7: List of MS4 sample locations and *E. coli* (colonies/100 mL) results in the Connecticut River watershed (continued)

Town	Location	MS4 Type	Receiving Waters	Sample Date	Result
Portland	C2 Tuccitto Rd	Commercial	CT River	01/09/08	800
Portland	C2 Tuccitto Rd	Commercial	CT River	09/11/09	1,450
Portland	C2 Tuccitto Rd	Commercial	CT River	11/20/09	1,200
Portland	I-1 Beneath Arrigoni Bridge	Industrial	CT River	11/30/05	1,050
Portland	I-1 Beneath Arrigoni Bridge	Industrial	CT River	01/05/07	0
Portland	I-1 Beneath Arrigoni Bridge	Industrial	CT River	01/09/08	450
Portland	I-1 Beneath Arrigoni Bridge	Industrial	CT River	09/11/09	1,200
Portland	I-1 Beneath Arrigoni Bridge	Industrial	CT River	11/20/09	2,600
Portland	R1 Middlesex Ave Ext	Residential	CT River	11/30/05	2,560
Portland	R1 Middlesex Ave Ext	Residential	CT River	01/05/07	25
Portland	R1 Middlesex Ave Ext	Residential	CT River	01/09/08	550
Portland	R1 Middlesex Ave Ext	Residential	CT River	09/11/09	400
Portland	R1 Middlesex Ave Ext	Residential	CT River	11/20/09	3,700
Portland	R2 William St/Scenic Dr	Residential	CT River	01/09/08	26
Portland	R2 William St/Scenic Dr	Residential	CT River	09/11/09	1,650
Portland	R2 William St/Scenic Dr	Residential	CT River	11/20/09	240
Portland	R2 William St/Senic Dr	Residential	CT River	11/30/05	15
Portland	R2 William St/Senic Dr	Residential	CT River	01/05/07	0
Suffield	(C-2) S side of Bridge St/Rte 513, 0.2 miles W of Bramble Ridge	Commercial	CT River	11/15/05	80
Suffield	(C-2) S side of Bridge St/Rte 513, 0.2 miles W of Bramble Ridge	Commercial	CT River	05/02/06	110
Suffield	(I-2) Bennet Rd CB located W of Bennet Rd across from Distributors	Industrial	CT River	09/29/06	10
Suffield	(I-2) Bennet Rd CB located W of Bennet Rd across from Distributors	Industrial	CT River	10/27/07	1,190
Suffield	(I-2) Bennet Rd CB located W of Bennet Rd across from Distributors	Industrial	CT River	11/13/08	4,200
Suffield	(I-2) Bennet Rd CB located W of Bennet Rd across from Distributors	Industrial	CT River	09/11/09	170
Suffield	(R-1) outfall approx 40 yards S of the road between #3 and #9 Grassman Pond Lane	Residential	CT River	11/02/06	40
Suffield	(R-1) outfall approx 40 yards S of the road between #3 and #9 Grassman Pond Lane	Residential	CT River	10/27/07	4,400
Suffield	(R-1) outfall approx 40 yards S of the road between #3 and #9 Grassman Pond Lane	Residential	CT River	11/13/08	100
Suffield	(R-1) outfall approx 40 yards S of the road between #3 and #9 Grassman Pond Lane	Residential	CT River	09/11/09	80

Shaded cells indicate an exceedance of single-sample based water quality criteria (410 colonies/100 mL)

Figure 9: MS4 areas of the Connecticut River watershed



Publicly Owned Treatment Works

Figures 7, 8, and 9 show multiple publicly owned treatment works (POTWs; also known as water treatment plants, WTP, or water pollution control facilities, WPCF), along Segment 1 and Segment 3 of the Connecticut River. The Mattabasset WPCF (in Cromwell), East Haddam WPCF, East Hampton WPCF, East Hartford WPCF, East Windsor WPCF, Enfield WPCF, Glastonbury WPCF, Hartford WPCF, Middletown WPCF, Portland WPCF, South Windsor WPCF, Suffield WPCF, Windsor Locks WPCF, and Rocky Hill WPCF all discharge to one of the impaired segments of the Connecticut River. Bacteria data from the discharges of these plants are included in Table 8. The East Haddam WPCF had exceedances of the 30-day and 7-day geometric means. The Glastonbury WPCF, Middletown WPCF, and Rocky Hill WPCF all had exceedances of the 7-day geometric mean. The remaining plants did not exceed their permit limits on any dates sampled (Table 8).

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	05/31/2009	6	60
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	06/30/2009	7	61
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	07/31/2009	3	20
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	08/31/2009	9	53
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	09/30/2009	25	58
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	10/31/2009	30	61
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	05/31/2010	5	15
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	06/30/2010	9	32
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	07/31/2010	4	29
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	08/31/2010	9	53
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	09/30/2010	19	180
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	10/31/2010	14	48
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	05/31/2011	2	15
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	06/30/2011	1	13
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	07/31/2011	4	37
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	08/31/2011	13	91
Cromwell	Mattabassett WPCF	CT0100307	Connecticut River	09/30/2011	16	67

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	06/30/2009	88	110
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	07/31/2009	465	470
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	08/31/2009	150	280
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	09/30/2009	279	600
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	05/31/2010	122	1500
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	08/31/2010	95	900
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	09/30/2010	117	460
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	06/30/2011	17	30
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	07/31/2011	140	140
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	08/31/2011	20	40
East Haddam	East Haddam WPCF	CT0101761	Connecticut River	09/30/2011	32	100
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	05/31/2009	20	31
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	06/30/2009	28	41
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	07/31/2009	12	20
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	08/31/2009	11	14
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	09/30/2009	22	44
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	05/31/2010	41	69
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	06/30/2010	44	56
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	07/31/2010	15	65

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	08/31/2010	17	29
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	09/30/2010	12	17
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	05/31/2011	7	11
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	06/30/2011	6	18
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	07/31/2011	17	43
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	08/31/2011	18	30
East Hampton	East Hampton WPCF	CT0024694	Connecticut River	09/30/2011	13	43
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	05/31/2009	20	32
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	06/30/2009	7	16
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	07/31/2009	16	36
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	08/31/2009	12	28
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	09/30/2009	7	14
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	05/31/2010	19	30
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	06/30/2010	20	20
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	07/31/2010	23	37
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	08/31/2010	19	30
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	09/30/2010	24	31
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	05/31/2011	13	20
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	06/30/2011	10	10
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	07/31/2011	11	15

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	08/31/2011	9	15
East Hartford	East Hartford WPCF	CT0100170	Connecticut River	09/30/2011	11	24
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	05/31/2009	8	16
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	06/30/2009	3	5
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	07/31/2009	4	5
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	08/31/2009	3	3
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	09/30/2009	6	17
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	05/31/2010	6	24
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	06/30/2010	4	32
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	07/31/2010	3	9
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	08/31/2010	3	15
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	09/30/2010	5	18
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	05/31/2011	7	26
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	06/30/2011	3	13
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	07/31/2011	3	21
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	08/31/2011	6	24
East Windsor	East Windsor WPCF	CT0100196	Connecticut River	09/30/2011	24	147
Enfield	Enfield WPCF	CT0100200	Connecticut River	05/31/2009	6	15
Enfield	Enfield WPCF	CT0100200	Connecticut River	06/30/2009	4	10
Enfield	Enfield WPCF	CT0100200	Connecticut River	07/31/2009	5	8

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Enfield	Enfield WPCF	CT0100200	Connecticut River	08/31/2009	6	26
Enfield	Enfield WPCF	CT0100200	Connecticut River	09/30/2009	4	9
Enfield	Enfield WPCF	CT0100200	Connecticut River	05/31/2010	9	19
Enfield	Enfield WPCF	CT0100200	Connecticut River	06/30/2010	8	17
Enfield	Enfield WPCF	CT0100200	Connecticut River	07/31/2010	3	9
Enfield	Enfield WPCF	CT0100200	Connecticut River	08/31/2010	3	5
Enfield	Enfield WPCF	CT0100200	Connecticut River	09/30/2010	4	8
Enfield	Enfield WPCF	CT0100200	Connecticut River	05/31/2011	14	29
Enfield	Enfield WPCF	CT0100200	Connecticut River	06/30/2011	3	5
Enfield	Enfield WPCF	CT0100200	Connecticut River	07/31/2011	4	8
Enfield	Enfield WPCF	CT0100200	Connecticut River	08/31/2011	2	6
Enfield	Enfield WPCF	CT0100200	Connecticut River	09/30/2011	3	7
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	06/30/2009	46	442
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	07/31/2009	56	165
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	08/31/2009	37	277
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	09/30/2009	35	109
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	05/31/2010	13	43
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	06/30/2010	3	8
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	07/31/2010	8	12
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	08/31/2010	16	53
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	09/30/2010	14	32
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	5/31/2011	9	16
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	6/30/2011	6	7
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	7/31/2011	13	68
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	8/31/2011	20	26
Glastonbury	Glastonbury WPCF	CT0100226	Connecticut River	9/30/2011	14	20
Hartford	Hartford WPCF	CT0100251	Connecticut River	05/31/2009	14	20
Hartford	Hartford WPCF	CT0100251	Connecticut River	06/30/2009	8	15
Hartford	Hartford WPCF	CT0100251	Connecticut River	07/31/2009	6	7
Hartford	Hartford WPCF	CT0100251	Connecticut River	08/31/2009	5	5
Hartford	Hartford WPCF	CT0100251	Connecticut River	09/30/2009	4	8
Hartford	Hartford WPCF	CT0100251	Connecticut River	05/31/2010	16	18
Hartford	Hartford WPCF	CT0100251	Connecticut River	06/30/2010	23	56
Hartford	Hartford WPCF	CT0100251	Connecticut River	07/31/2010	20	24
Hartford	Hartford WPCF	CT0100251	Connecticut River	08/31/2010	24	84
Hartford	Hartford WPCF	CT0100251	Connecticut River	09/30/2010	19	24
Hartford	Hartford WPCF	CT0100251	Connecticut River	05/31/2011	10	15
Hartford	Hartford WPCF	CT0100251	Connecticut River	06/30/2011	10	14

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Hartford	Hartford WPCF	CT0100251	Connecticut River	07/31/2011	13	22
Hartford	Hartford WPCF	CT0100251	Connecticut River	08/31/2011	9	10
Hartford	Hartford WPCF	CT0100251	Connecticut River	09/30/2011	12	29
Middletown	Middletown WPCF	CT0100323	Connecticut River	05/31/2009	14	18
Middletown	Middletown WPCF	CT0100323	Connecticut River	06/30/2009	26	108
Middletown	Middletown WPCF	CT0100323	Connecticut River	07/31/2009	86	786
Middletown	Middletown WPCF	CT0100323	Connecticut River	08/31/2009	14	16
Middletown	Middletown WPCF	CT0100323	Connecticut River	09/30/2009	10	24
Middletown	Middletown WPCF	CT0100323	Connecticut River	06/30/2010	13	18
Middletown	Middletown WPCF	CT0100323	Connecticut River	07/31/2010	25	95
Middletown	Middletown WPCF	CT0100323	Connecticut River	08/31/2010	16	29
Middletown	Middletown WPCF	CT0100323	Connecticut River	09/30/2010	24	116
Middletown	Middletown WPCF	CT0100323	Connecticut River	05/31/2011	17	89
Middletown	Middletown WPCF	CT0100323	Connecticut River	06/30/2011	58	1097
Middletown	Middletown WPCF	CT0100323	Connecticut River	07/31/2011	40	69
Middletown	Middletown WPCF	CT0100323	Connecticut River	08/31/2011	20	59
Middletown	Middletown WPCF	CT0100323	Connecticut River	09/30/2011	60	2531
Portland	Portland WPCF	CT0101150	Connecticut River	05/31/2009	8	40
Portland	Portland WPCF	CT0101150	Connecticut River	06/30/2009	25	67
Portland	Portland WPCF	CT0101150	Connecticut River	07/31/2009	21	190
Portland	Portland WPCF	CT0101150	Connecticut River	08/31/2009	26	82
Portland	Portland WPCF	CT0101150	Connecticut River	09/30/2009	22	43
Portland	Portland WPCF	CT0101150	Connecticut River	05/31/2010	42	160
Portland	Portland WPCF	CT0101150	Connecticut River	06/30/2010	11	37
Portland	Portland WPCF	CT0101150	Connecticut River	07/31/2010	63	310
Portland	Portland WPCF	CT0101150	Connecticut River	08/31/2010	25	53
Portland	Portland WPCF	CT0101150	Connecticut River	09/30/2010	13	25
Portland	Portland WPCF	CT0101150	Connecticut River	05/31/2011	4	12
Portland	Portland WPCF	CT0101150	Connecticut River	06/30/2011	5	9
Portland	Portland WPCF	CT0101150	Connecticut River	07/31/2011	6	13
Portland	Portland WPCF	CT0101150	Connecticut River	08/31/2011	26	110
Portland	Portland WPCF	CT0101150	Connecticut River	09/30/2011	12	45
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	05/31/2009	54	103
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	06/30/2009	38	70
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	07/31/2009	23	35

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	08/31/2009	25	49
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	09/30/2009	28	384
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	05/31/2010	40	178
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	06/30/2010	53	82
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	07/31/2010	66	146
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	08/31/2010	43	99
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	09/30/2010	24	98
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	05/31/2011	28	41
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	06/30/2011	54	98
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	08/31/2011	24	47
South Windsor	South Windsor WPCF	CT0100510	Connecticut River	09/30/2011	42	156
Suffield	Suffield WPCF	CT0100552	Connecticut River	05/31/2009	3	27
Suffield	Suffield WPCF	CT0100552	Connecticut River	06/30/2009	14	67
Suffield	Suffield WPCF	CT0100552	Connecticut River	07/31/2009	8	221
Suffield	Suffield WPCF	CT0100552	Connecticut River	08/31/2009	17	70
Suffield	Suffield WPCF	CT0100552	Connecticut River	09/30/2009	5	96
Suffield	Suffield WPCF	CT0100552	Connecticut River	05/31/2010	2	12
Suffield	Suffield WPCF	CT0100552	Connecticut River	06/30/2010	3	20
Suffield	Suffield WPCF	CT0100552	Connecticut River	07/31/2010	1	18
Suffield	Suffield WPCF	CT0100552	Connecticut River	08/31/2010	2	26
Suffield	Suffield WPCF	CT0100552	Connecticut River	09/30/2010	4	72
Suffield	Suffield WPCF	CT0100552	Connecticut River	05/31/2011	4	11
Suffield	Suffield WPCF	CT0100552	Connecticut River	06/30/2011	3	11
Suffield	Suffield WPCF	CT0100552	Connecticut River	07/31/2011	6	33
Suffield	Suffield WPCF	CT0100552	Connecticut River	09/30/2011	12	74
Windsor Locks	Windsor Locks WPCF	CT0101591	Connecticut River	05/31/2009	3	8

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Windsor Locks	Windsor Locks WPCF	CT0101591	Connecticut River	06/30/2009	3	61
Windsor Locks	Windsor Locks WPCF	CT0101592	Connecticut River	07/31/2009	5	119
Windsor Locks	Windsor Locks WPCF	CT0101593	Connecticut River	08/31/2009	4	20
Windsor Locks	Windsor Locks WPCF	CT0101594	Connecticut River	09/30/2009	3	13
Windsor Locks	Windsor Locks WPCF	CT0101595	Connecticut River	05/31/2010	1	5
Windsor Locks	Windsor Locks WPCF	CT0101596	Connecticut River	06/30/2010	9	49
Windsor Locks	Windsor Locks WPCF	CT0101597	Connecticut River	07/31/2010	8	17
Windsor Locks	Windsor Locks WPCF	CT0101598	Connecticut River	08/31/2010	8	57
Windsor Locks	Windsor Locks WPCF	CT0101599	Connecticut River	09/30/2010	7	196
Windsor Locks	Windsor Locks WPCF	CT0101600	Connecticut River	05/31/2011	1	4
Windsor Locks	Windsor Locks WPCF	CT0101601	Connecticut River	06/30/2011	3	36
Windsor Locks	Windsor Locks WPCF	CT0101602	Connecticut River	07/31/2011	5	35
Windsor Locks	Windsor Locks WPCF	CT0101603	Connecticut River	08/31/2011	4	53
Windsor Locks	Windsor Locks WPCF	CT0101604	Connecticut River	09/30/2011	3	20
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	05/31/2009	82	1237
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	06/30/2009	5	20
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	07/31/2009	6	22
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	08/31/2009	6	16
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	09/30/2009	7	50
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	05/31/2010	19	20
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	06/30/2010	19	20
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	07/31/2010	19	20
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	08/31/2010	20	22
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	09/30/2010	19	20

Table 8: Wastewater treatment plant Fecal Coliform (colonies/100 mL) data discharging to the Connecticut River (continued)

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	05/31/2011	13	25
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	06/30/2011	10	11
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	07/31/2011	10	12
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	08/31/2011	14	76
Rocky Hill	Rocky Hill WPCF	CT0100480	Connecticut River	09/30/2011	10	22
30-Day Geometric Mean Permit Limit = 200 colonies/100 mL **7-Day Geometric Mean Permit Limit = 400 colonies/100 mL** **Shaded cells indicate an exceedance of permit limits**						

Non-point Sources

Non-point source pollution (NPS) comes from many diffuse sources and is more difficult to identify and control. NPS pollution is often associated with land-use practices. Examples of NPS that can contribute bacteria to surface waters include insufficient septic systems, pet and wildlife waste, agriculture, and contact recreation (swimming or wading). Potential sources of NPS within the Connecticut River watershed are described below.

Stormwater Runoff from Developed Areas

Approximately 32% of the land use in the watershed is considered urban, and the majority of this area is concentrated around the northern portion of the watershed surrounding Segment 3 (Figure 4). Urban areas are often characterized by impervious cover, or surface areas such as roofs and roads that force water to run off land surfaces rather than infiltrate into the soil. Studies have shown a link between increasing impervious cover and degrading water quality conditions in a watershed (CWP, 2003). In one study, researchers correlated the amount of fecal coliform to the percent of impervious cover in a watershed (Mallin *et al.,* 2000).

The majority of the Connecticut River watershed has less than 6% impervious surfaces (Figures 10 and 11). The southern portions of the watershed surrounding Segment 1 are characterized as 0-6% impervious cover, with small pockets of 7-11% impervious cover. However, portions of the watershed near the northern section of the watershed surrounding Segment 3 have higher percentages of impervious cover (Figure 11). In particular, portions of the watershed in Hartford, East Hartford, Windsor, Windsor Locks, and Enfield, CT have an impervious cover consistently >16%, indicating that stormwater runoff in these portions of the watershed may be a source of bacteria to Segment 3.

Figure 10: Range of impervious cover (%) in the Connecticut River watershed

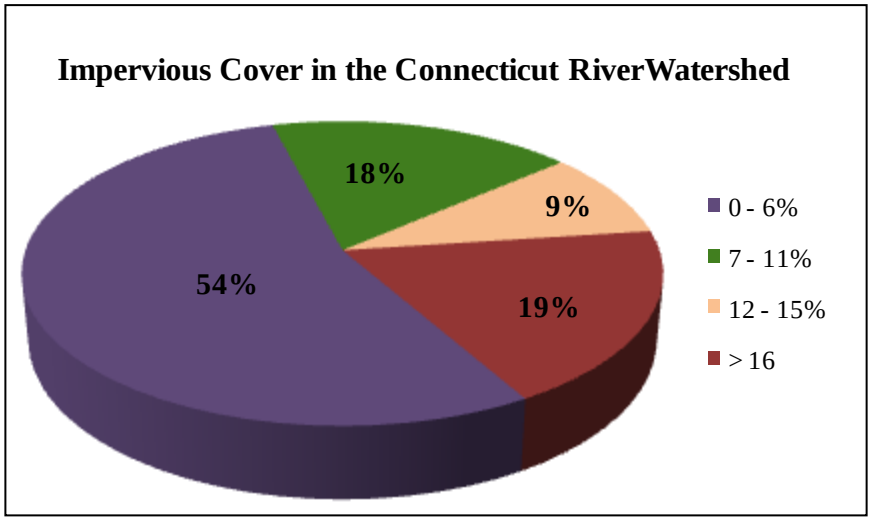
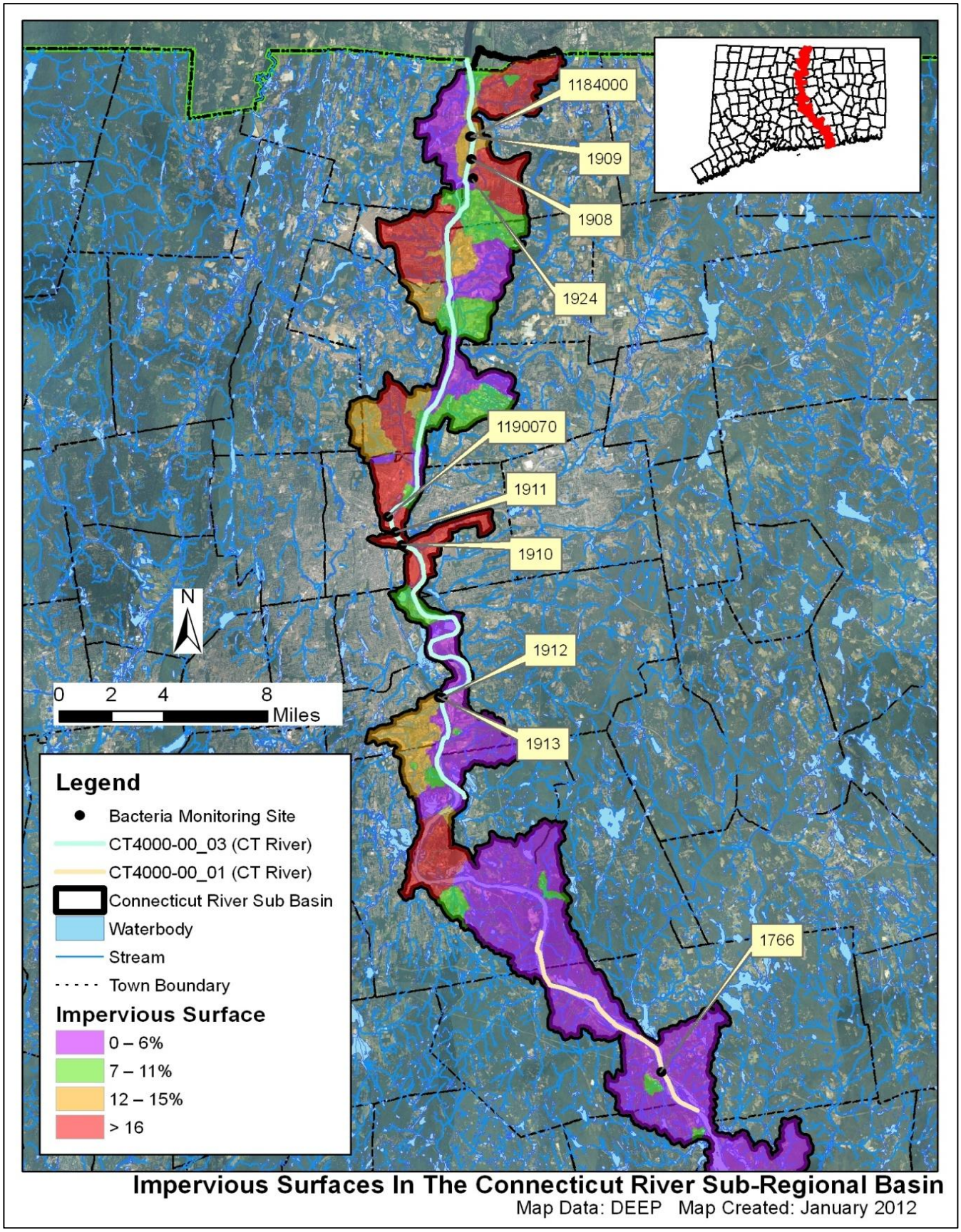


Figure 11: Impervious cover (%) for the Connecticut River sub-regional watershed



Combined Sewer Overflows (CSOs)

CSOs represent a likely source of bacterial contamination within the Connecticut River watershed, specifically to Segment 3. As seen in Figure 8, there are multiple CSOs located on Segment 3 in the greater Hartford area. Combined sewers systems carry water from both sanitary and storm sewers. These systems convey their contents to a publicly owned treatment works (POTW). When there is a significant rain event, storm sewers collect and transfer large volumes of water into combined sewers. When the volume of water entering the POTW surpasses the capacity of the facility, combined sewers will overflow at designated CSOs to reduce the volume of water entering the facility. When combined sewers overflow, they deposit raw sewage with high levels of bacteria into the receiving water. CSOs located on Segment 3 of the Connecticut River around Hartford are a likely source of bacterial contamination to the impaired segment.

Insufficient Septic Systems and Illicit Discharges

As shown in Figures 7 and 8, many areas of the Connecticut River watershed rely on onsite wastewater treatment systems, such as septic systems, particularly in the southern portion of Segment 1. Properly managed septic systems and leach fields have the ability to effectively remove bacteria from waste. If systems are not maintained, waste will not be adequately treated and may result in bacteria reaching nearby surface and ground water. If this system does not have a proper maintenance plan, it may be a source of bacteria to the Connecticut River.

In Connecticut, local health directors, heath departments, or health districts are responsible for keeping track of any reported insufficient or failing septic systems in a specific municipality. The Towns of Enfield, Suffield, East Windsor, and Windsor Locks are members of the regional North Central District Health Department (http://www.ncdhd.org/). The Town of Windsor has its own Health Department (http://www.townofwindsorct.com/health/). The Town of South Windsor has its own Health Department (http://www.southwindsor.org/pages/swindsorct_health/index). The City of Hartford has its own Department of Health and Human Services, with an Environmental Health Division (http://hhs.hartford.gov/webfiles/Environment.aspx). The Town of East Hartford has its own Heath Department with an Environmental Health Division (http://easthartfordct.gov/Public_Documents/EastHartfordCT_Health/ENVhealth). The Town of Glastonbury has its own Health Department (http://www.glasct.org/index.aspx?page=117). The Towns of Wethersfield and Rocky Hill are members of the regional Central Connecticut Health District (http://ccthd.org/). The Town of Cromwell has its own Health Department (http://www.cromwellct.com/Town%20Departments/Health.htm). The Towns of Portland, East Haddam, East Hampton, and Haddam are members of the regional Chatham Health District (http://www.chathamhealth.org/aboutus.htm). The City of Middletown has its own Health Department (http://www.cityofmiddletown.com/content/117/121/149/). The Town of Chester is part of the regional Connecticut River Area Health District (http://www.crahd.org/).

Most areas within the northern portion of the watershed surrounding Segment 3 have access to a sanitary sewer. Sewer system leaks and other illicit discharges that are located within the watershed of Segment 1 and Segment 3 may be contributing bacteria to these waterbodies.

Wildlife and Domestic Animal Waste

Wildlife and domestic animals within the Connecticut River watershed represent another potential source of bacteria to the impaired waterbodies. Elevated bacteria levels that are due solely to a natural population of wildlife are not subject to the WQS. Any exacerbation of wildlife population sizes or residency times influenced by human activities are subject to the CT WQS and TMDL provisions.

With the construction of roads and drainage systems, these wildlife wastes may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface waterbody. As such these physical land alterations can exacerbate the impact of natural sources on water quality (USEPA, 2001). As the majority of the watershed surrounding Segment 1 is undeveloped, wildlife waste is a potential source of bacteria in the Connecticut River watershed.

The George Dudley Seymour State Park in Haddam near Segment 1 has large grassed fields adjacent to the Connecticut River. There are recreational fields near Segment 3 in Riverfront Park of Welles Street in Glastonbury. The TPC River Highlands Golf Course is also located near Segment 3 off Field Road in Cromwell. Geese and other waterfowl are known to congregate in open areas including recreational fields, golf courses, and agricultural crop fields. In addition to creating a nuisance, large numbers of geese can also create unsanitary conditions on the grassed areas and cause water quality problems due to bacterial contamination associated with their droppings. Large populations of geese can also lead to habitat destruction as a result of overgrazing on wetland and riparian plants.

Most residential development in the watershed is located near the impaired segments. There are several areas where residential development is near Segment 1 in Haddam and East Haddam. Segment 3 of the Connecticut River, particularly in the greater Hartford area has a considerable amount of residential development near the river. Waste from domestic animals such as dogs, may also be contributing to bacteria concentrations in this impaired segment in the Connecticut River watershed.

Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in many areas of the state. Runoff from agricultural fields may contain pollutants such as bacteria and nutrients (USEPA, 2011a). There are several smaller agricultural fields near Segment 1 of the Connecticut River off Ray Hill Road in East Haddam and Island Dock Road in Haddam. Nearly all agricultural operations within the watershed are located in the northern portion of the watershed surrounding Segment 3. There are very large agricultural fields off Main Street and Tyron Street in Glastonbury, Elm Street Extension, and Great Meadow Road in Rocky Hill, 2nd Lane in Wethersfield, Palisado Avenue in Windsor, Main Street in South Windsor, and East Street North in Suffield (Figure 5). Agricultural runoff from these farms and others in the area is a potential source of bacteria to the Connecticut River.

Additional Sources

There may be other sources not listed here or identified in Figures 7 or 8 that contribute to the observed water quality impairment in the Connecticut River watershed. Further monitoring and investigation will confirm the listed sources and discover additional ones. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement this TMDL.

Land Use/Landscape

Riparian Buffer Zones

The riparian buffer zone is the area of land located immediately adjacent to streams, lakes, or other surface waters. The boundary of the riparian zone and the adjoining uplands is gradual and not always well-defined. However, riparian zones differ from uplands because of high levels of soil moisture, frequent flooding, and the unique assemblage of plant and animal communities found there. Through the interaction of their soils, hydrology, and vegetation, natural riparian areas influence water quality as contaminants are taken up into plant tissues, adsorbed onto soil particles, or modified by soil organisms.

Any change to the natural riparian buffer zone can reduce the effectiveness of the natural buffer and has the potential to contribute to water quality impairment (USEPA, 2011b).

The CLEAR program at UCONN has created streamside buffer layers for the entire State of Connecticut (http://clear.uconn.edu/), which have been used in this TMDL. Analyzing this information can reveal potential sources and implementation opportunities at a localized level. The land use directly adjacent to a waterbody can have direct impacts on water quality from surface runoff sources.

The riparian zones for the southern portion of the watershed surrounding Segment 1 of the Connecticut River are characterized by forested areas with some developed areas, agricultural areas, and turf grass areas (Figure 12). The riparian zones for the northern portion of the watershed surrounding Segment 3 of the Connecticut River are characterized by a mix of developed and agricultural areas. There are also some forested and turf grass areas as well (Figure 13). As previously noted, developed areas within the riparian zone likely contribute pollutants such as bacteria to the waterbody since the natural riparian buffer is not available to treat runoff. Agricultural areas within the riparian zone can also contribute bacteria to the adjacent surface water. Turf grass within the riparian zone, when frequented by waterfowl, can also be a source of bacterial contamination.

Figure 12: Riparian buffer zone information for the Connecticut River watershed (CT4000-00_01)

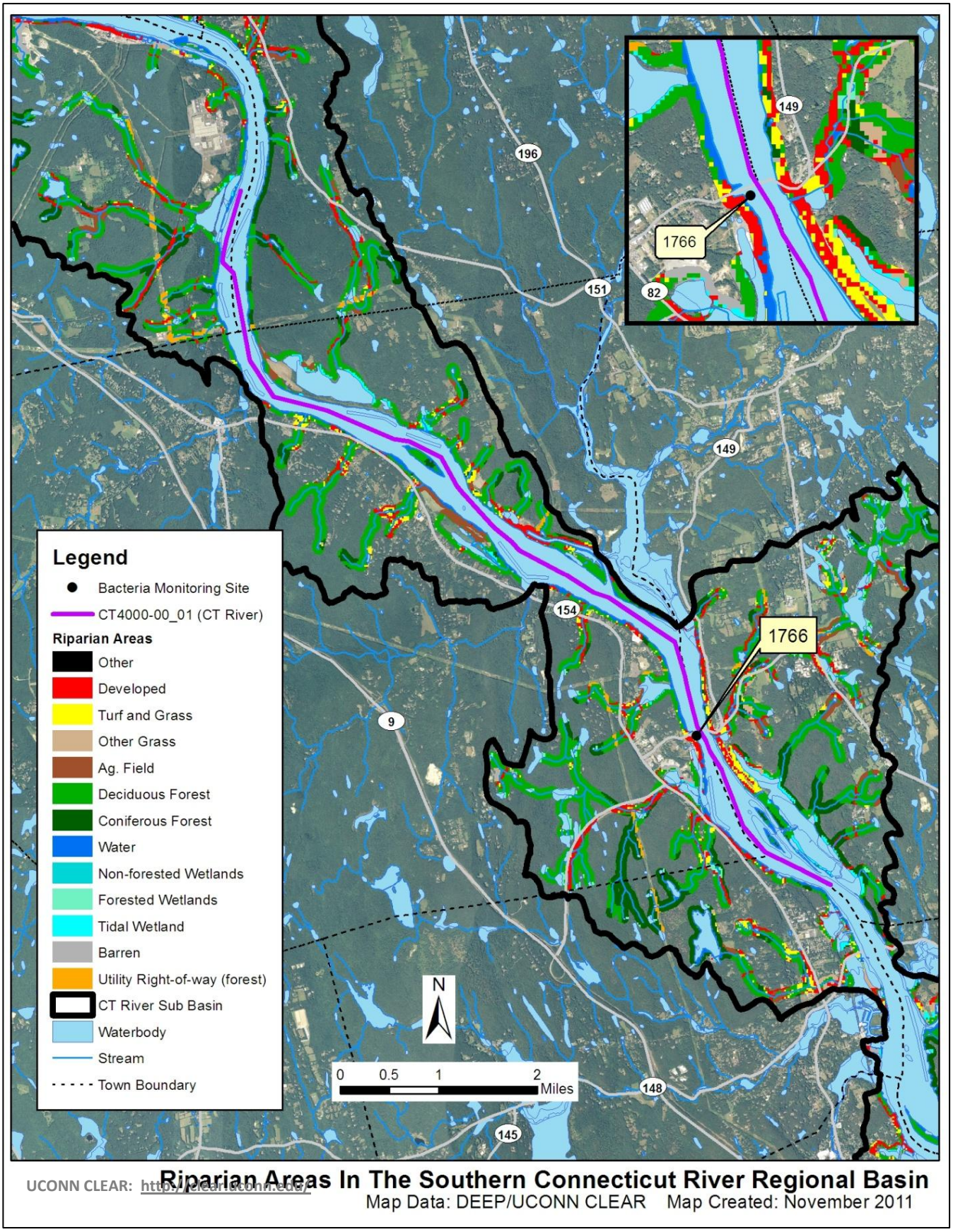
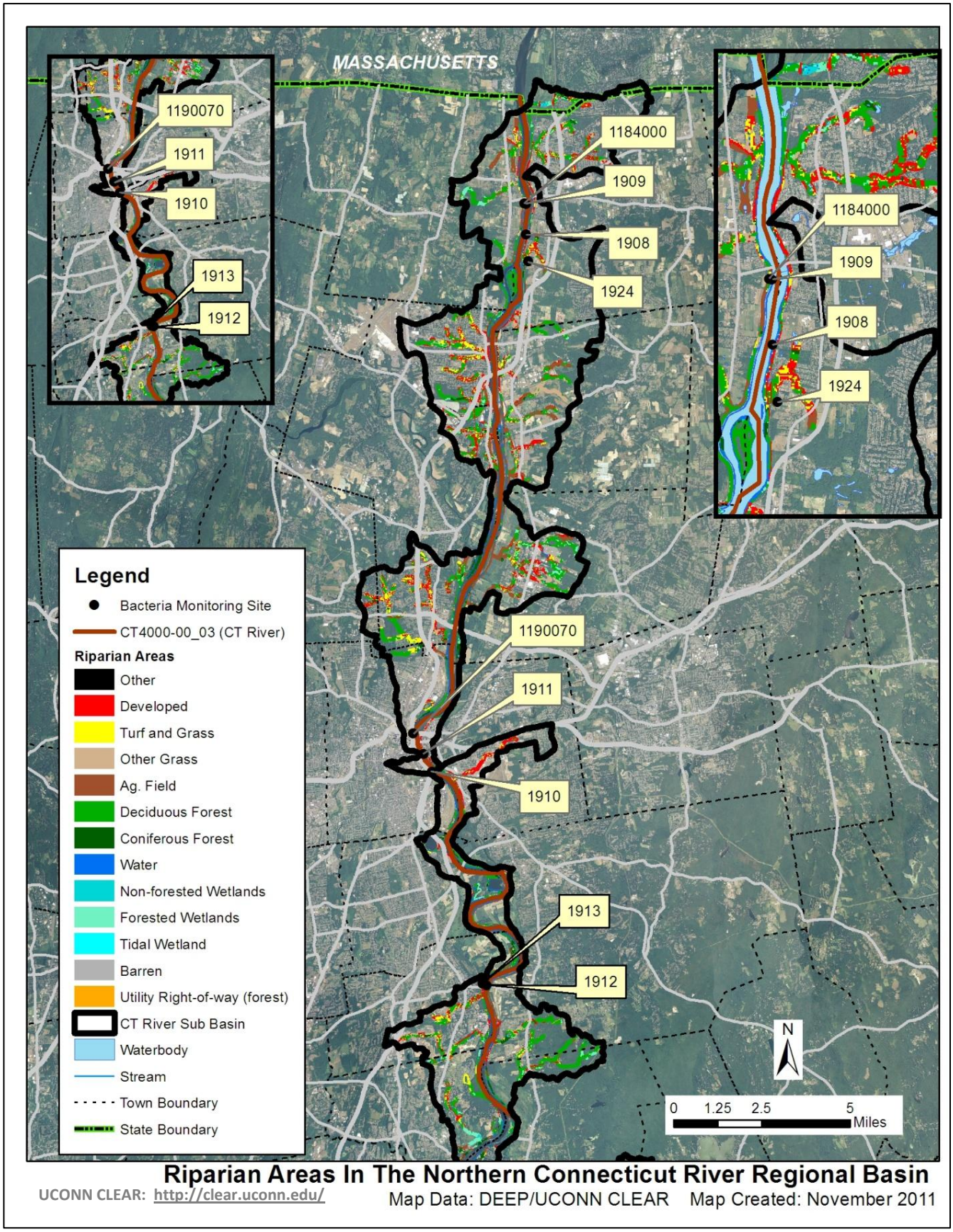


Figure 13: Riparian buffer zone information for the Connecticut River watershed (CT4000-00_03)



CURRENT MANAGEMENT ACTIVITIES

As indicated previously, the portions of the watershed in Suffield, Enfield, Windsor, Windsor Locks, South Windsor, East Windsor, Hartford, East Hartford, Wethersfield, Glastonbury, Rocky Hill, Cromwell, Portland, Middletown, and Chester are regulated under the MS4 program. The MS4 General Permit is required for any municipality with urbanized areas that initiates, creates, originates or maintains any discharge of stormwater from a storm sewer system to waters of the State. The MS4 permit requires towns to design a Stormwater Management Plan (SMP) to reduce the discharge of pollutants in stormwater to improve water quality. The plan must address the following 6 minimum measures:

1. Public Education and Outreach.
2. Public Involvement/Participation.
3. Illicit discharge detection and elimination.
4. Construction site stormwater runoff control.
5. Post-construction stormwater management in the new development and redevelopment.
6. Pollution prevention/good housekeeping for municipal operations.

Each municipality is also required to submit an annual update outlining the steps they are taking to meet the six minimum measures. All updates that address bacterial contamination in the watershed are summarized in Tables 9 - 16. MS4 Annual Reports for Chester, Portland, Wethersfield, East Hartford, South Windsor, Windsor Locks, and Rocky Hill were unavailable at the writing of this document.

Table 9: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Middletown, CT (Permit # GSM000011)

Minimum Measure	City of Middletown Annual Report
Public Outreach and Education	1) Developing educational resources.
Public Involvement and Participation	1) Will conduct community clean-ups. 2) Will update stormwater management plan.
Illicit Discharge Detection and Elimination	1) Mapping all outfalls greater than 12 inches. 2) Developed illicit discharge detection and elimination program.
Construction Site Stormwater Runoff Control	1) Reviewing land use regulations to meet MS4 permit requirements.
Post Construction Stormwater Management	1) Will develop post-construction ordinance or regulation.
Pollution Prevention and Good Housekeeping	1) Swept all streets at least once per year. 2) Will develop program to evaluate and clean stormwater structures at least once a year. 3) Will develop a pollution prevention plan.

Table 10: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Cromwell, CT (Permit # GSM000061)

Minimum Measure	Town of Cromwell 2004 Annual Report
Public Outreach and Education	1) Developing water-based education program.
Public Involvement and Participation	1) Developing water-based education program.
Illicit Discharge Detection and Elimination	1) Developing monitoring, illicit discharge and elimination programs. 2) Assessing threat to water quality priorities and revising, if necessary. 3) Creating stormwater ordinance enforcement program.
Construction Site Stormwater Runoff Control	1) Coordinating with town departments to consider amendments to street design and drainage design specifications. 2) Modifying stormwater guidelines and specifications. 3) Supporting ongoing development of stormwater runoff pollution programs.
Post Construction Stormwater Management	1) Enforcing BMP requirements for construction activities.
Pollution Prevention and Good Housekeeping	1) Implementing stormwater BMPs.

Table 11: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Glastonbury, CT (Permit # GSM000057)

Minimum Measure	Town of Glastonbury 2010 Annual Report
Public Outreach and Education	1) Partnered with Board of Education to add stormwater pollution prevention to school curriculum.
Public Involvement and Participation	1) Continued annual river bank clean-up efforts with student volunteers.
Illicit Discharge Detection and Elimination	1) Continued inspection program for outfall water quality. 2) Updated storm drain maps for recent subdivisions and road work.
Construction Site Stormwater Runoff Control	No updates.
Post Construction Stormwater Management	1) Revising ordinance to formalize implementation of BMPs.
Pollution Prevention and Good Housekeeping	No updates.

Table 12: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Hartford, CT (Permit # GSM000062)

Minimum Measure	City of Hartford 2010 Annual Report
Public Outreach and Education	1) Distributing stormwater brochures to city residents. 2) Distributing information regarding stormwater BMPs. 3) Developed stormwater videos which aired on local access TV. 4) Participated in CT River Watershed Council's Source to the Sound Cleanup.
Public Involvement and Participation	1) Participated in CT River Watershed Council's Source to the Sound Cleanup. 2) Sponsored/coordinated hazardous waste collection events.
Illicit Discharge Detection and Elimination	1) Inspecting nine outfalls for illicit discharges. 2) Distributing literature regarding illicit discharges.
Construction Site Stormwater Runoff Control	1) Assessed training needs of inspection staff relative to runoff controls measures.
Post Construction Stormwater Management	No updates
Pollution Prevention and Good Housekeeping	1) Cleaned and repaired catch basins throughout city. 2) Performed significant street cleaning; up to 3 times per week. 3) Performed stormwater training of key city staff.

Table 13: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Suffield, CT (Permit # GSM000015)

Minimum Measure	Town of Suffield 2011 Annual Report
Public Outreach and Education	1) Developing publications, newspaper articles on BMPs. 2) Program progressing in catch basin stenciling.
Public Involvement and Participation	1) Continuing to develop public participation program.
Illicit Discharge Detection and Elimination	1) Developing program to detect and eliminate illicit discharges. 2) Continuing to develop illicit discharge ordinance. 3) Continuing to develop inspection and monitoring of outfalls.
Construction Site Stormwater Runoff Control	1) Implemented regulations for construction site runoff.
Post Construction Stormwater Management	1) Continuing to develop ordinance for BMP strategies
Pollution Prevention and Good Housekeeping	1) Continuing to develop training program for municipal employees.

Table 14: Summary of MS4 requirement updates related to the reduction of bacterial contamination from East Windsor, CT (Permit # GSM000053)

Minimum Measure	East Windsor 2010 Annual Report
Public Outreach and Education	1) Marking and evaluating storm drains for catch basins. 2) Developing tributary signage.
Public Involvement and Participation	1) Implementing program where storm drain markers are available for homeowners and industry. 2) Organized stream clean-up day. 3) Implemented Hazardous Waste Collection Day.
Illicit Discharge Detection and Elimination	1) Developing town ordinance regarding non-stream water discharges. 2) Developed training program on proper disposal. 3) Developing a storm sewer system map. 4) Developed detection and elimination program through outfall monitoring.
Construction Site Stormwater Runoff Control	1) Created compliance guidelines for erosion & sediment control. 2) Developed registration requirement for site developers. 3) Developed ordinance for site operators to control waste. 4) Developed training program on proper erosion & sediment control BMPs.
Post Construction Stormwater Management	1) Developed protection of conservation easement areas from development. 2) Created plan to use water quality basins and grass filter strips near outfalls. 3) Created plan for infiltration and underground water recharge.
Pollution Prevention and Good Housekeeping	1) Kept salt storage pile fully enclosed. 2) Provided training to all employees on stormwater management. 3) Implemented street sweeping program. 4) Created catch basin maintenance program.

Table 15: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Windsor, CT (Permit # GSM000066)

Minimum Measure	Town of Windsor 2010 Annual Report
Public Outreach and Education	1) Catch basins marked with warnings and flyer provided for public. 2) Developed and distributed educational materials.
Public Involvement and Participation	1) Organized and conducted community clean ups
Illicit Discharge Detection and Elimination	1) Continually updating outfall mapping. 2) Developing and implementing a plan to detect and address non-stormwater discharges. 3) Train employees to identify and report illicit discharges.
Construction Site Stormwater Runoff Control	1) Developed E&S control ordinance.
Post Construction Stormwater Management	1) Continue to review applications for required post-construction designs. 2) Expanding stormwater manual to include BMPs.
Pollution Prevention and Good Housekeeping	1) Continuing stormwater management training to DPW and staff. 2) Continuing to sweep streets and clean catch basins.

Table 16: Summary of MS4 requirement updates related to the reduction of bacterial contamination from Enfield, CT (Permit # GSM000086)

Minimum Measure	Enfield 2005 Annual Permit Report
Public Outreach and Education	1) Supplied educational material related to treatment and preservation of inland wetlands and watercourses. 2) Supplied information to property owners regarding protection and preservation of steep slopes from erosion.
Public Involvement and Participation	1) Supported annual clean-up of Connecticut River and Scantic River. 2) Created Source to Sea Clean-up program to pick up debris along the Connecticut River. 3) Initiating a program for catch basin marking and watercourse signage.
Illicit Discharge Detection and Elimination	1) Conducted non-point source stormwater monitoring at six locations. 2) Developed town-wide watershed map with storm drain outlet locations. 3) Initiated monthly collection of motor oil & automotive batteries.
Construction Site Stormwater Runoff Control	1) Conducted random inspections of construction sites to ensure compliance.
Post Construction Stormwater Management	No updates.
Pollution Prevention and Good Housekeeping	1) Created inventory of facilities with stormwater outfalls.

RECOMMENDED NEXT STEPS

Many of the towns within the Connecticut River watershed have developed and implemented programs to protect water quality from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of the Connecticut River and have been prioritized below.

1) Continue with an implementation plan to remove CSOs and SSOs in the greater Hartford Area.

There are multiple combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) located on the Connecticut River in the greater Hartford area (Figure 8). The Metropolitan District (MDC) is a regional water pollution authority providing drinking water and sanitary sewer access to the municipalities in the greater Hartford area (www.themdc.com). The MDC is in the initial stages of implementing a program aimed at removing the CSOs and SSOs in its area. This effort is called the Clean Water Project and has three basic elements: (1) reduction of CSOs, (2) elimination of sanitary sewer overflows (SSOs) in the sanitary sewers of Wethersfield, West Hartford, Windsor, Rocky Hill, and Newington and (3) nitrogen reductions. The existing sewage systems have more than 38 CSOs, and 8 active SSOs, which release more than 1 billion gallons of wastewater to the area waterways, including impaired Segment 3 of the Connecticut River (MDC, 2010). More information on the Clean Water Project can be found on the MDC's website on their Clean Water Project Page (http://www.themdc.com/abouttheproject.shtml).

Removal of CSOs is cost inhibitive and municipalities do not have the resources to handle such a task on their own. In order to assist with implementing these large scale projects, the State of Connecticut developed the Connecticut Clean Water Fund (CWF). The fund provides financial assistance to municipalities for the planning, design and construction of wastewater collection and treatment projects. The CWF funds 20% of project costs and provides a low interest loan for the remaining balance. The CWF has a special incentive for entities attempting to correct CSOs. CSO correction projects receive a 50% grant for project costs and a low interest loan for the remainder (CTDEEP, CWF). It is this level of financial support that allows projects such MDC's Clean Water Project to move forward. It is important for the communities serviced by the MDC to continue working with and supporting the CSO and SSO removal efforts. Removing the CSOs on Segment 3, and the SSOs within Wethersfield and Rocky Hill will help reduce bacteria concentrations within the Connecticut River, and should continue to be a priority. As long as the CSOs and SSOs are active, they will be a source of bacterial contamination to the Connecticut River, especially to Segment 3.

2) Continue monitoring of permitted sources.

Previous sampling of discharges from permitted sources within the watershed has shown elevated levels of *E. coli* and fecal coliform bacteria, indicators of bacterial pollution (Tables 6 - 8). Further monitoring will provide information essential to better locate, understand, and reduce pollution sources. If any current monitoring is not done with appropriate bacterial indicator based on the receiving water, then a recommended change during the next permit reissuance is to include the appropriate indicator species. If facility monitoring indicates elevated bacteria, then implementation of permit required, and voluntary measures to identify and reduce sources of bacterial contamination at the facility are an additional recommendation. Regular monitoring should be established for all permitted sources to ensure compliance with permit requirements and to determine if current requirements are adequate or if additional measures are necessary for water quality protection.

Section 6(k) of the MS4 General Permit requires a municipality to modify their Stormwater Management Plan to implement the TMDL within four months of TMDL approval by EPA if stormwater within the municipality contributes pollutant(s) in excess of the allocation established by the TMDL. For discharges

to impaired waterbodies, the municipality must assess and modify the six minimum measures of its plan, if necessary, to meet TMDL standards. Particular focus should be placed on the following plan components: public education, illicit discharge detection and elimination, stormwater structures cleaning, and the repair, upgrade, or retrofit of storm sewer structures. The goal of these modifications is to establish a program that improves water quality consistent with TMDL requirements. Modifications to the Stormwater Management Plan in response to TMDL development should be submitted to the Stormwater Program of DEEP for review and approval.

Table 17 details the appropriate bacteria criteria for use as waste load allocations established by this TMDL for use as water quality targets by permittees as permits are renewed and updated, within the Connecticut River watershed.

For any municipality subject to an MS4 permit and affected by a TMDL, the permit requires a modification of the SMP to include BMPs that address the included impairment. In the case of bacteria related impairments municipal BMPs could include: implementation or improvement to existing nuisance wildlife programs, septic system monitoring programs, any additional measures that can be added to the required illicit discharge detection and elimination (IDDE) programs, and increased street sweeping above basic permit requirements. Any non-MS4 municipalities can implement these same types of initiatives in effort to reduce bacteria source loading to impaired waterways.

Any facilities that discharge non-MS4 regulated stormwater should update their Pollution Prevention Plan to reflect BMPs that can reduce bacteria loading to the receiving waterway. These BMPs could include nuisance wildlife control programs and any installations that increase surface infiltration to reduce overall stormwater volumes. Facilities that are regulated under the Commercial Activities Stormwater Permit should report any updates to their SMP in their summary documentation submitted to DEEP.

Table 17. Bacteria (e.coli) TMDLs, WLAs, and LAs for Recreational Use

		Instantaneous *E. coli* (#/100mL)						Geometric Mean *E. coli* (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**			**LA[6]**			**WLA[6]**	**LA[6]**
	Recreational Use	**1**	**2**	**3**	**1**	**2**	**3**	**All**	**All**
B[4]	Non-Stormwater NPDES	235	410	576				126	
	CSOs	235	410	576				126	
	SSOs	0	0	0				0	
	Illicit sewer connection	0	0	0				0	
	Leaking sewer lines	0	0	0				0	
	Stormwater (MS4s)	235[7]	410[7]	576[7]				126[7]	
	Stormwater (non-MS4)				235[7]	410[7]	576[7]		126[7]
	Wildlife direct discharge				235[7]	410[7]	576[7]		126[7]
	Human or domestic animal direct discharge[5]				235	410	576		126

(1) **Designated Swimming.** Procedures for monitoring and closure of bathing areas by State and Local Health Authorities are specified in: Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by the Department of Environmental Protections and the Department of Public Health. May 1989. Revised April 2003 and updated December 2008.

(2) **Non-Designated Swimming.** Includes areas otherwise suitable for swimming but which have not been designated by State or Local authorities as bathing areas, waters which support tubing, water skiing, or other recreational activities where full body contact is likely.

(3) **All Other Recreational Uses.**

(4) Criteria for the protection of recreational uses in Class B waters do not apply when disinfection of sewage treatment plant effluents is not required consistent with Standard 23. (Class B surface waters located north of Interstate Highway I-95 and downstream of a sewage treatment plant providing seasonal disinfection May 1 through October 1, as authorized by the Commissioner.)

(5) Human direct discharge = swimmers

(6) Unless otherwise required by statute or regulation, compliance with this TMDL will be based on ambient concentrations and not end-of-pipe bacteria concentrations

(7) Replace numeric value with "natural levels" if only source is naturally occurring wildlife. Natural is defined as the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences (CT DEEP 2011a). Sections 2.2.2 and 6.2.7 of this Core Document deal with BMPs and delineating type of wildlife inputs.

3) Identify areas in the Connecticut River watershed to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, 32% of the Connecticut River watershed is considered urban, and 15 out of 18 municipalities within the Connecticut River watershed are MS4 communities regulated by the MS4 program. The northern portions of the watershed surrounding Segment 3 contain some of the most developed areas within Connecticut. Portions of the watershed surrounding Segment 3 have an impervious cover greater than 12% and several areas are characterized by impervious surfaces >16% (Figure 5). As such, stormwater runoff is likely contributing bacteria to the Connecticut River, particularly Segment 3. To identify other areas that are contributing bacteria to the impaired segments, the municipalities should continue to conduct wet-weather sampling at stormwater outfalls that discharge directly to the impaired segments in the Connecticut River watershed. Outfalls that have previously shown high bacteria concentrations should be prioritized for BMP installation (Table 7). To treat stormwater runoff, the towns should identify areas along the more developed sections of the impaired segments to install BMPs designed to encourage stormwater to infiltrate into the ground before entering the waterbodies. These BMPs would disconnect impervious areas and reduce pollutant loads to the river. More detailed information and BMP recommendations can be found in the core TMDL document.

4) Ensure there are sufficient buffers on agricultural lands along the Connecticut River.

If not already in place, agricultural producers should work with the CT Department of Agriculture and the U.S. Department of Agriculture Natural Resources Conservation Service to develop conservation plans for their farming activities within the watershed. These plans should focus on ensuring that there are sufficient stream buffers, that fencing exists to restrict livestock and horse access to streams and wetlands, and that animal waste handling, disposal, and other appropriate Best Management Practices (BMPs) are in place. Particular attention should be paid to those agricultural operations located within the riparian buffer zone of impaired Segment 3 of the Connecticut River (Figure 13).

5) Implement a program to evaluate the sanitary sewer system.

Most of the residents and businesses surrounding Segment 3 rely on a municipal sewer system (Figure 8). Ensuring there are no leaks or overflows from the sanitary sewer in this area should be made a priority. It is important for municipalities surrounding Segment 3 to develop programs that evaluate their sanitary sewers and reduce leaks and overflows. This program should include periodic inspections of the sewer line.

6) Develop a system to monitor septic systems.

Nearly all residents surrounding the impaired segments, particularly Segment 1, rely on septic systems. If not already in place, all towns within the watershed should establish a program to ensure that existing septic systems are properly operated and maintained. For instance, communities can create an inventory of existing septic systems through mandatory inspections. Inspections help encourage proper maintenance and identify failed and sub-standard systems. Policies that govern the eventual replacement

of the sub-standard systems within a reasonable timeframe could also be adopted. Towns can also develop programs to assist citizens with the replacement and repair of older and failing systems.

7) Evaluate municipal education and outreach programs regarding animal waste.

As large portions of the Connecticut River watershed are undeveloped, any education and outreach program should highlight the importance of not feeding waterfowl and wildlife and managing waste from horses, dogs, and other pets. The towns and residents can take measures to minimize waterfowl-related impacts such as allowing tall, coarse vegetation to grow in the riparian areas of the impaired segments that are frequented by waterfowl. Waterfowl, especially grazers like geese, prefer easy access to water. Maintaining an uncut vegetated buffer along the shore will make the habitat less desirable to geese and encourage migration. In addition, any educational program should emphasize that feeding waterfowl, such as ducks, geese, and swans, may contribute to water quality impairments in the Connecticut River watershed and can harm human health and the environment. Animal wastes should be disposed of away from any waterbody or storm drain system. BMPs effective at reducing the impact of animal waste on water quality include installing signage, providing pet waste receptacles in high-uses areas, enacting ordinances requiring the clean-up of pet waste, and targeting educational and outreach programs in problem areas.

BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 18: Connecticut River (Segment 1) Bacteria Data

Waterbody ID: CT4000-00_01

Characteristics: Freshwater, Class B, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **67%**

Single Sample: **74%**

Data: 2003 - 2009 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 1) with annual geometric means calculated

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1766	Connecticut River at East Haddam	10/15/2003	160	wet	**384* (67%)**
1766	Connecticut River at East Haddam	12/17/2003	920	dry	
1766	Connecticut River at East Haddam	2/10/2004	780	dry	177
1766	Connecticut River at East Haddam	4/7/2004	700	dry	
1766	Connecticut River at East Haddam	6/22/2004	27	dry	
1766	Connecticut River at East Haddam	8/4/2004	30	dry	
1766	Connecticut River at East Haddam	9/3/2004	36	dry	
1766	Connecticut River at East Haddam	10/18/2004	840	dry	
1766	Connecticut River at East Haddam	12/22/2004	400	dry	
1766	Connecticut River at East Haddam	2/14/2005	660	dry	167
1766	Connecticut River at East Haddam	4/27/2005	400	dry	
1766	Connecticut River at East Haddam	6/23/2005	320	dry**	
1766	Connecticut River at East Haddam	8/24/2005	17	dry	
1766	Connecticut River at East Haddam	10/6/2005	22	dry	
1766	Connecticut River at East Haddam	12/7/2005	680	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 1) with annual geometric means calculated by station (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1766	Connecticut River at East Haddam	2/2/2006	580	dry**	200
1766	Connecticut River at East Haddam	4/17/2006	320	dry	
1766	Connecticut River at East Haddam	6/28/2006	230	dry	
1766	Connecticut River at East Haddam	8/28/2006	80	wet	
1766	Connecticut River at East Haddam	10/10/2006	24	dry	
1766	Connecticut River at East Haddam	11/27/2006	1100	wet	
1766	Connecticut River at East Haddam	12/11/2006	140	dry	
1766	Connecticut River at East Haddam	2/7/2007	650	dry	126
1766	Connecticut River at East Haddam	4/5/2007	**1600* (74%)**	wet	
1766	Connecticut River at East Haddam	6/5/2007	100	wet	
1766	Connecticut River at East Haddam	8/16/2007	3	dry	
1766	Connecticut River at East Haddam	10/15/2007	15	dry	
1766	Connecticut River at East Haddam	12/13/2007	870	dry	
1766	Connecticut River at East Haddam	2/5/2008	320	dry	176
1766	Connecticut River at East Haddam	4/8/2008	360	dry	
1766	Connecticut River at East Haddam	6/5/2008	13	wet**	
1766	Connecticut River at East Haddam	8/4/2008	120	dry**	
1766	Connecticut River at East Haddam	10/1/2008	140	dry**	
1766	Connecticut River at East Haddam	12/2/2008	1200	wet**	
1766	Connecticut River at East Haddam	2/12/2009	730	wet	109
1766	Connecticut River at East Haddam	4/9/2009	290	dry**	
1766	Connecticut River at East Haddam	6/10/2009	13	wet**	
1766	Connecticut River at East Haddam	8/25/2009	52	dry	

Shaded cells indicate an exceedance of water quality criteria

**** Weather conditions for selected data taken from Hartford because local station had missing data**

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for all monitoring stations on the Connecticut River (Segment 1)

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
1766	Connecticut River at East Haddam	2003-2009	9	29	168	191	162

Shaded cells indicate an exceedance of water quality criteria
Weather condition determined from rain gages at Norwich Public Utility Plant in Norwich, CT and at Hartford Bradley International Airport

Table 19: Connecticut River Bacteria Data

Waterbody ID: CT4000-00_03

Characteristics: Freshwater, Class B, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **81%**

Single Sample: **98%**

Data: 2003 - 2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1912	At Glastonbury Ferry Dock	6/6/2006	110	dry	192
1912	At Glastonbury Ferry Dock	6/20/2006	110	wet	
1912	At Glastonbury Ferry Dock	6/27/2006	490	dry	
1912	At Glastonbury Ferry Dock	7/10/2006	52	dry	
1912	At Glastonbury Ferry Dock	7/17/2006	112†	dry	
1912	At Glastonbury Ferry Dock	7/24/2006	240	wet	
1912	At Glastonbury Ferry Dock	8/4/2006	475†	dry	
1912	At Glastonbury Ferry Dock	8/11/2006	190	wet	
1912	At Glastonbury Ferry Dock	8/15/2006	200	wet	
1912	At Glastonbury Ferry Dock	8/25/2006	285†	dry	
1912	At Glastonbury Ferry Dock	9/5/2006	310	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1912	At Glastonbury Ferry Dock	6/11/2007	70	dry	114
1912	At Glastonbury Ferry Dock	6/18/2007	20	dry	
1912	At Glastonbury Ferry Dock	6/25/2007	31	wet	
1912	At Glastonbury Ferry Dock	7/6/2007	110	dry	
1912	At Glastonbury Ferry Dock	7/16/2007	225†	dry	
1912	At Glastonbury Ferry Dock	8/1/2007	15850†	dry	
1912	At Glastonbury Ferry Dock	8/15/2007	63	wet	
1912	At Glastonbury Ferry Dock	8/17/2007	98	dry	
1912	At Glastonbury Ferry Dock	8/22/2007	62	dry	
1912	At Glastonbury Ferry Dock	8/24/2007	57†	wet	
1912	At Glastonbury Ferry Dock	6/5/2008	120	dry	379
1912	At Glastonbury Ferry Dock	6/13/2008	240	wet	
1912	At Glastonbury Ferry Dock	6/24/2008	1600†	dry	
1912	At Glastonbury Ferry Dock	7/10/2008	41	dry	
1912	At Glastonbury Ferry Dock	7/16/2008	41	wet	
1912	At Glastonbury Ferry Dock	7/24/2008	1100	wet	
1912	At Glastonbury Ferry Dock	8/1/2008	580	wet	
1912	At Glastonbury Ferry Dock	8/7/2008	880	wet	
1912	At Glastonbury Ferry Dock	8/15/2008	3700	dry	
1912	At Glastonbury Ferry Dock	6/5/2009	31	wet	179
1912	At Glastonbury Ferry Dock	6/12/2009	74	wet	
1912	At Glastonbury Ferry Dock	7/2/2009	240	dry	
1912	At Glastonbury Ferry Dock	7/10/2009	97	wet	
1912	At Glastonbury Ferry Dock	7/17/2009	1600	wet	
1912	At Glastonbury Ferry Dock	7/24/2009	1500	wet	
1912	At Glastonbury Ferry Dock	7/31/2009	480	dry	
1912	At Glastonbury Ferry Dock	8/7/2009	41	dry	
1912	At Glastonbury Ferry Dock	8/14/2009	74	wet	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1912	At Glastonbury Ferry Dock	6/10/2010	160	dry	
1912	At Glastonbury Ferry Dock	6/25/2010	280†	dry	
1912	At Glastonbury Ferry Dock	7/9/2010	10	wet	
1912	At Glastonbury Ferry Dock	7/16/2010	98	wet	
1912	At Glastonbury Ferry Dock	7/23/2010	4400	dry	
1912	At Glastonbury Ferry Dock	7/28/2010	220	wet	128
1912	At Glastonbury Ferry Dock	8/5/2010	580	dry	
1912	At Glastonbury Ferry Dock	8/13/2010	52†	dry	
1912	At Glastonbury Ferry Dock	8/20/2010	300	dry	
1912	At Glastonbury Ferry Dock	8/27/2010	40	dry	
1912	At Glastonbury Ferry Dock	9/7/2010	10	dry	
1913	At Rocky Hill Ferry Dock	6/6/2006	235†	dry	
1913	At Rocky Hill Ferry Dock	6/20/2006	115†	wet	
1913	At Rocky Hill Ferry Dock	6/27/2006	550	dry	
1913	At Rocky Hill Ferry Dock	7/10/2006	10	dry	
1913	At Rocky Hill Ferry Dock	7/17/2006	52	dry	
1913	At Rocky Hill Ferry Dock	7/24/2006	230†	wet	149
1913	At Rocky Hill Ferry Dock	8/4/2006	590	dry	
1913	At Rocky Hill Ferry Dock	8/11/2006	96	wet	
1913	At Rocky Hill Ferry Dock	8/15/2006	110	wet	
1913	At Rocky Hill Ferry Dock	8/25/2006	350	dry	
1913	At Rocky Hill Ferry Dock	9/5/2006	200	dry	
1913	At Rocky Hill Ferry Dock	6/11/2007	30†	dry	
1913	At Rocky Hill Ferry Dock	6/18/2007	41†	dry	
1913	At Rocky Hill Ferry Dock	6/25/2007	10	wet	
1913	At Rocky Hill Ferry Dock	7/6/2007	195†	dry	
1913	At Rocky Hill Ferry Dock	7/16/2007	140	dry	
1913	At Rocky Hill Ferry Dock	8/1/2007	63	dry	59
1913	At Rocky Hill Ferry Dock	8/15/2007	75†	wet	
1913	At Rocky Hill Ferry Dock	8/17/2007	51	dry	
1913	At Rocky Hill Ferry Dock	8/22/2007	46†	dry	
1913	At Rocky Hill Ferry Dock	8/24/2007	150	dry	
1913	At Rocky Hill Ferry Dock	9/6/2007	52	wet	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1913	At Rocky Hill Ferry Dock	6/5/2008	58†	dry	
1913	At Rocky Hill Ferry Dock	6/13/2008	74	wet	
1913	At Rocky Hill Ferry Dock	6/24/2008	1900	dry	
1913	At Rocky Hill Ferry Dock	7/10/2008	63	dry	
1913	At Rocky Hill Ferry Dock	7/16/2008	25†	wet	225
1913	At Rocky Hill Ferry Dock	7/24/2008	2500†	wet	
1913	At Rocky Hill Ferry Dock	8/1/2008	630	wet	
1913	At Rocky Hill Ferry Dock	8/7/2008	930	wet	
1913	At Rocky Hill Ferry Dock	8/15/2008	80†	dry	
1913	At Rocky Hill Ferry Dock	6/5/2009	20	wet	
1913	At Rocky Hill Ferry Dock	6/12/2009	10	wet	
1913	At Rocky Hill Ferry Dock	7/2/2009	240	dry	
1913	At Rocky Hill Ferry Dock	7/10/2009	96	wet	
1913	At Rocky Hill Ferry Dock	7/17/2009	2300	wet	170
1913	At Rocky Hill Ferry Dock	7/24/2009	2550†	wet	
1913	At Rocky Hill Ferry Dock	7/31/2009	370†	dry	
1913	At Rocky Hill Ferry Dock	8/7/2009	86	dry	
1913	At Rocky Hill Ferry Dock	8/14/2009	140	wet	
1913	At Rocky Hill Ferry Dock	6/10/2010	200	dry	
1913	At Rocky Hill Ferry Dock	6/25/2010	120	dry	
1913	At Rocky Hill Ferry Dock	7/9/2010	10	wet	
1913	At Rocky Hill Ferry Dock	7/16/2010	52	wet	
1913	At Rocky Hill Ferry Dock	7/23/2010	80†	dry	
1913	At Rocky Hill Ferry Dock	7/28/2010	41	wet	45
1913	At Rocky Hill Ferry Dock	8/5/2010	520	dry	
1913	At Rocky Hill Ferry Dock	8/13/2010	10†	dry	
1913	At Rocky Hill Ferry Dock	8/20/2010	10	dry	
1913	At Rocky Hill Ferry Dock	8/27/2010	70	dry	
1913	At Rocky Hill Ferry Dock	9/7/2010	10	wet	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1910	At Charter Oak Landing boat launch	6/6/2006	130	dry	385
1910	At Charter Oak Landing boat launch	6/20/2006	200	wet	
1910	At Charter Oak Landing boat launch	6/27/2006	560	dry	
1910	At Charter Oak Landing boat launch	7/10/2006	31	dry	
1910	At Charter Oak Landing boat launch	7/17/2006	270	dry	
1910	At Charter Oak Landing boat launch	7/24/2006	340	wet	
1910	At Charter Oak Landing boat launch	8/4/2006	460	dry	
1910	At Charter Oak Landing boat launch	8/11/2006	1100	wet	
1910	At Charter Oak Landing boat launch	8/15/2006	**24001*(98%)**	wet	
1910	At Charter Oak Landing boat launch	8/25/2006	420	dry	
1910	At Charter Oak Landing boat launch	9/5/2006	130†	dry	
1910	At Charter Oak Landing boat launch	6/11/2007	30	dry	62
1910	At Charter Oak Landing boat launch	6/18/2007	52	dry	
1910	At Charter Oak Landing boat launch	6/25/2007	25†	wet	
1910	At Charter Oak Landing boat launch	7/6/2007	590	dry	
1910	At Charter Oak Landing boat launch	7/16/2007	560	dry	
1910	At Charter Oak Landing boat launch	8/1/2007	150	dry	
1910	At Charter Oak Landing boat launch	8/15/2007	10	wet	
1910	At Charter Oak Landing boat launch	8/17/2007	10	dry	
1910	At Charter Oak Landing boat launch	8/22/2007	140†	dry	
1910	At Charter Oak Landing boat launch	8/24/2007	31	wet	
1910	At Charter Oak Landing boat launch	6/5/2008	52	dry	282
1910	At Charter Oak Landing boat launch	6/13/2008	25†	wet	
1910	At Charter Oak Landing boat launch	6/24/2008	4800	dry	
1910	At Charter Oak Landing boat launch	7/10/2008	97	dry	
1910	At Charter Oak Landing boat launch	7/16/2008	52	wet	
1910	At Charter Oak Landing boat launch	7/24/2008	7700	wet	
1910	At Charter Oak Landing boat launch	8/1/2008	395†	wet	
1910	At Charter Oak Landing boat launch	8/7/2008	1350†	wet	
1910	At Charter Oak Landing boat launch	8/15/2008	86	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1910	At Charter Oak Landing boat launch	6/5/2009	10	wet	
1910	At Charter Oak Landing boat launch	6/12/2009	3200†	wet	
1910	At Charter Oak Landing boat launch	7/2/2009	8250†	dry	
1910	At Charter Oak Landing boat launch	7/10/2009	320	wet	
1910	At Charter Oak Landing boat launch	7/17/2009	1400	wet	496
1910	At Charter Oak Landing boat launch	7/24/2009	9200	wet	
1910	At Charter Oak Landing boat launch	7/31/2009	260	dry	
1910	At Charter Oak Landing boat launch	8/7/2009	63†	dry	
1910	At Charter Oak Landing boat launch	8/14/2009	102†	wet	
1910	At Charter Oak Landing boat launch	6/10/2010	52	dry	
1910	At Charter Oak Landing boat launch	6/25/2010	52	dry	
1910	At Charter Oak Landing boat launch	7/9/2010	10	wet	
1910	At Charter Oak Landing boat launch	7/16/2010	81†	wet	
1910	At Charter Oak Landing boat launch	7/23/2010	250	dry	
1910	At Charter Oak Landing boat launch	7/28/2010	10	wet	46
1910	At Charter Oak Landing boat launch	8/5/2010	190	dry	
1910	At Charter Oak Landing boat launch	8/13/2010	41	dry	
1910	At Charter Oak Landing boat launch	8/20/2010	20	dry	
1910	At Charter Oak Landing boat launch	8/27/2010	65†	dry	
1910	At Charter Oak Landing boat launch	9/7/2010	35†	dry	
1911	At Great River Park boat launch	6/6/2006	160	dry	
1911	At Great River Park boat launch	6/20/2006	140	wet	
1911	At Great River Park boat launch	6/27/2006	575†	dry	
1911	At Great River Park boat launch	7/10/2006	10	dry	
1911	At Great River Park boat launch	7/17/2006	30	dry	
1911	At Great River Park boat launch	7/24/2006	320	wet	163
1911	At Great River Park boat launch	8/4/2006	310	dry	
1911	At Great River Park boat launch	8/11/2006	500	wet	
1911	At Great River Park boat launch	8/15/2006	360	wet	
1911	At Great River Park boat launch	8/25/2006	170	dry	
1911	At Great River Park boat launch	9/5/2006	180	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1911	At Great River Park boat launch	6/11/2007	30	dry	58
1911	At Great River Park boat launch	6/18/2007	20	dry	
1911	At Great River Park boat launch	6/25/2007	20	wet	
1911	At Great River Park boat launch	7/6/2007	160	dry	
1911	At Great River Park boat launch	7/16/2007	460	dry	
1911	At Great River Park boat launch	8/1/2007	180	dry	
1911	At Great River Park boat launch	8/15/2007	20	wet	
1911	At Great River Park boat launch	8/17/2007	73	dry	
1911	At Great River Park boat launch	8/22/2007	41	dry	
1911	At Great River Park boat launch	8/24/2007	47†	wet	
1911	At Great River Park boat launch	6/5/2008	74	dry	195
1911	At Great River Park boat launch	6/13/2008	41	wet	
1911	At Great River Park boat launch	6/24/2008	4000	dry	
1911	At Great River Park boat launch	7/10/2008	41	dry	
1911	At Great River Park boat launch	7/16/2008	10	wet	
1911	At Great River Park boat launch	7/24/2008	1100	wet	
1911	At Great River Park boat launch	8/1/2008	495†	wet	
1911	At Great River Park boat launch	8/7/2008	3700	wet	
1911	At Great River Park boat launch	8/15/2008	41	dry	
1911	At Great River Park boat launch	6/5/2009	20	wet	129
1911	At Great River Park boat launch	6/12/2009	195†	wet	
1911	At Great River Park boat launch	7/2/2009	515†	dry	
1911	At Great River Park boat launch	7/10/2009	51	wet	
1911	At Great River Park boat launch	7/17/2009	150†	wet	
1911	At Great River Park boat launch	7/24/2009	410	wet	
1911	At Great River Park boat launch	7/31/2009	520	dry	
1911	At Great River Park boat launch	8/7/2009	31	dry	
1911	At Great River Park boat launch	8/14/2009	97	wet	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1911	At Great River Park boat launch	6/10/2010	41†	dry	40
1911	At Great River Park boat launch	6/25/2010	36†	dry	
1911	At Great River Park boat launch	7/9/2010	41†	wet	
1911	At Great River Park boat launch	7/16/2010	46†	wet	
1911	At Great River Park boat launch	7/23/2010	86†	dry	
1911	At Great River Park boat launch	7/28/2010	20	wet	
1911	At Great River Park boat launch	8/5/2010	230	dry	
1911	At Great River Park boat launch	8/13/2010	31	dry	
1911	At Great River Park boat launch	8/20/2010	10	dry	
1911	At Great River Park boat launch	8/27/2010	55†	dry	
1911	At Great River Park boat launch	9/7/2010	20†	dry	
1190070	Connecticut River at Hartford	10/15/2003	230	wet	299
1190070	Connecticut River at Hartford	12/17/2003	390	wet	
1190070	Connecticut River at Hartford	2/10/2004	300	dry	82
1190070	Connecticut River at Hartford	4/7/2004	16	dry	
1190070	Connecticut River at Hartford	6/22/2004	35	dry	
1190070	Connecticut River at Hartford	8/4/2004	220	dry	
1190070	Connecticut River at Hartford	9/3/2004	79	dry	
1190070	Connecticut River at Hartford	10/18/2004	84	dry	
1190070	Connecticut River at Hartford	12/22/2004	100	dry	
1190070	Connecticut River at Hartford	2/14/2005	44	wet	48
1190070	Connecticut River at Hartford	4/27/2005	62	wet	
1190070	Connecticut River at Hartford	6/23/2005	30	dry	
1190070	Connecticut River at Hartford	8/24/2005	22	dry	
1190070	Connecticut River at Hartford	10/6/2005	32	dry	
1190070	Connecticut River at Hartford	12/7/2005	210	dry	
1190070	Connecticut River at Hartford	2/2/2006	350	dry	62
1190070	Connecticut River at Hartford	4/17/2006	6	dry	
1190070	Connecticut River at Hartford	6/28/2006	170	wet	
1190070	Connecticut River at Hartford	8/28/2006	980	wet	
1190070	Connecticut River at Hartford	10/10/2006	5	dry	
1190070	Connecticut River at Hartford	12/11/2006	33	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1190070	Connecticut River at Hartford	2/7/2007	330	dry	148
1190070	Connecticut River at Hartford	4/5/2007	110	wet	
1190070	Connecticut River at Hartford	6/5/2007	1700	wet	
1190070	Connecticut River at Hartford	8/16/2007	12	dry	
1190070	Connecticut River at Hartford	10/15/2007	29	dry	
1190070	Connecticut River at Hartford	12/13/2007	490	wet	
1190070	Connecticut River at Hartford	2/5/2008	220	wet	48
1190070	Connecticut River at Hartford	4/8/2008	18	dry	
1190070	Connecticut River at Hartford	6/5/2008	36	wet	
1190070	Connecticut River at Hartford	8/4/2008	33	dry	
1190070	Connecticut River at Hartford	10/1/2008	56	dry	
1190070	Connecticut River at Hartford	12/2/2008	330	wet	
1190070	Connecticut River at Hartford	2/12/2009	410	wet	117
1190070	Connecticut River at Hartford	4/9/2009	31	dry	
1190070	Connecticut River at Hartford	6/10/2009	250	wet	
1190070	Connecticut River at Hartford	8/25/2009	60	dry	
1924	At Kings Island State boat ramp	6/28/2006	**24001* (98%)**	dry	380
1924	At Kings Island State boat ramp	7/3/2006	150	dry	
1924	At Kings Island State boat ramp	7/25/2006	280	dry	
1924	At Kings Island State boat ramp	8/3/2006	5350[†]	dry	
1924	At Kings Island State boat ramp	8/10/2006	86	wet	
1924	At Kings Island State boat ramp	8/16/2006	1100	dry	
1924	At Kings Island State boat ramp	8/22/2006	86	dry	
1924	At Kings Island State boat ramp	8/31/2006	230	dry	
1924	At Kings Island State boat ramp	9/6/2006	150	dry	
1924	At Kings Island State boat ramp	9/12/2006	41	wet	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1924	At Kings Island State boat ramp	6/6/2007	500	dry	152
1924	At Kings Island State boat ramp	6/13/2007	380	dry	
1924	At Kings Island State boat ramp	6/21/2007	130	dry	
1924	At Kings Island State boat ramp	6/27/2007	460	wet	
1924	At Kings Island State boat ramp	7/11/2007	160	wet	
1924	At Kings Island State boat ramp	7/23/2007	120	dry	
1924	At Kings Island State boat ramp	8/2/2007	31	dry	
1924	At Kings Island State boat ramp	8/16/2007	415†	dry	
1924	At Kings Island State boat ramp	8/23/2007	20	dry	
1924	At Kings Island State boat ramp	8/28/2007	120	dry	
1924	At Kings Island State boat ramp	5/22/2008	31†	wet	225
1924	At Kings Island State boat ramp	6/4/2008	1800	dry	
1924	At Kings Island State boat ramp	6/11/2008	670	wet	
1924	At Kings Island State boat ramp	6/16/2008	31	wet	
1924	At Kings Island State boat ramp	6/23/2008	7600	dry	
1924	At Kings Island State boat ramp	7/7/2008	130	wet	
1924	At Kings Island State boat ramp	7/31/2008	1200	wet	
1924	At Kings Island State boat ramp	8/6/2008	10	dry	
1924	At Kings Island State boat ramp	8/14/2008	120	dry	
1924	At Kings Island State boat ramp	8/20/2008	200	dry	
1924	At Kings Island State boat ramp	6/3/2009	85	wet	171
1924	At Kings Island State boat ramp	6/10/2009	1230†	dry	
1924	At Kings Island State boat ramp	6/25/2009	62†	dry	
1924	At Kings Island State boat ramp	7/15/2009	63	wet	
1924	At Kings Island State boat ramp	7/22/2009	2700	wet	
1924	At Kings Island State boat ramp	7/29/2009	96	dry	
1924	At Kings Island State boat ramp	8/13/2009	98	dry	
1924	At Kings Island State boat ramp	8/20/2009	120	dry	
1924	At Kings Island State boat ramp	9/2/2009	98	wet	
1908	Adjacent to Parsons Road near RR crossing	6/14/2006	98	wet	NA

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1908	Adjacent to Parsons Road near RR crossing	6/10/2010	260†	wet	81
1908	Adjacent to Parsons Road near RR crossing	6/25/2010	130	dry	
1908	Adjacent to Parsons Road near RR crossing	7/9/2010	30†	dry	
1908	Adjacent to Parsons Road near RR crossing	7/16/2010	190	wet	
1908	Adjacent to Parsons Road near RR crossing	7/23/2010	52	wet	
1908	Adjacent to Parsons Road near RR crossing	7/28/2010	31	dry	
1908	Adjacent to Parsons Road near RR crossing	8/5/2010	650†	wet	
1908	Adjacent to Parsons Road near RR crossing	8/13/2010	52	dry	
1908	Adjacent to Parsons Road near RR crossing	8/20/2010	36†	dry	
1908	Adjacent to Parsons Road near RR crossing	8/27/2010	90	dry	
1908	Adjacent to Parsons Road near RR crossing	9/7/2010	30	dry	
1909	Upstream of entrance to canal	6/14/2006	74	wet	**661* (81%)**
1909	Upstream of entrance to canal	7/3/2006	63	dry	
1909	Upstream of entrance to canal	7/25/2006	2900	dry	
1909	Upstream of entrance to canal	8/3/2006	1300	dry	
1909	Upstream of entrance to canal	8/10/2006	1600	dry	
1909	Upstream of entrance to canal	8/16/2006	1300†	wet	
1909	Upstream of entrance to canal	8/22/2006	1300	dry	
1909	Upstream of entrance to canal	8/31/2006	1700	dry	
1909	Upstream of entrance to canal	9/6/2006	460	dry	
1909	Upstream of entrance to canal	9/12/2006	430	dry	
1909	Upstream of entrance to canal	6/6/2007	470	wet	30
1909	Upstream of entrance to canal	6/13/2007	74	dry	
1909	Upstream of entrance to canal	6/21/2007	20	dry	
1909	Upstream of entrance to canal	6/27/2007	10	dry	
1909	Upstream of entrance to canal	7/11/2007	98	wet	
1909	Upstream of entrance to canal	7/23/2007	41	wet	
1909	Upstream of entrance to canal	8/2/2007	10	dry	
1909	Upstream of entrance to canal	8/16/2007	10	dry	
1909	Upstream of entrance to canal	8/23/2007	20	dry	
1909	Upstream of entrance to canal	8/28/2007	10	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1909	Upstream of entrance to canal	5/22/2008	30	dry	147
1909	Upstream of entrance to canal	6/4/2008	110	wet	
1909	Upstream of entrance to canal	6/4/2008	130	dry	
1909	Upstream of entrance to canal	6/11/2008	63	wet	
1909	Upstream of entrance to canal	6/16/2008	31	wet	
1909	Upstream of entrance to canal	6/23/2008	620	dry	
1909	Upstream of entrance to canal	7/7/2008	51	wet	
1909	Upstream of entrance to canal	7/31/2008	2900	wet	
1909	Upstream of entrance to canal	8/6/2008	2350†	dry	
1909	Upstream of entrance to canal	8/14/2008	120	dry	
1909	Upstream of entrance to canal	8/20/2008	31	dry	
1909	Upstream of entrance to canal	6/3/2009	30	wet	59
1909	Upstream of entrance to canal	6/10/2009	97	dry	
1909	Upstream of entrance to canal	6/25/2009	31	dry	
1909	Upstream of entrance to canal	7/15/2009	20	wet	
1909	Upstream of entrance to canal	7/22/2009	1000	wet	
1909	Upstream of entrance to canal	7/29/2009	98	dry	
1909	Upstream of entrance to canal	8/13/2009	85	dry	
1909	Upstream of entrance to canal	8/20/2009	20	dry	
1909	Upstream of entrance to canal	9/2/2009	31	wet	
1909	Upstream of entrance to canal	6/10/2010	52	dry	35
1909	Upstream of entrance to canal	6/25/2010	52	dry	
1909	Upstream of entrance to canal	7/9/2010	41	wet	
1909	Upstream of entrance to canal	7/16/2010	41	wet	
1909	Upstream of entrance to canal	7/23/2010	31	dry	
1909	Upstream of entrance to canal	7/28/2010	10	wet	
1909	Upstream of entrance to canal	8/5/2010	340†	dry	
1909	Upstream of entrance to canal	8/13/2010	10	dry	
1909	Upstream of entrance to canal	8/20/2010	35†	dry	
1909	Upstream of entrance to canal	8/27/2010	31	dry	
1909	Upstream of entrance to canal	9/7/2010	20	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1184000	Connecticut River at Thompsonville	10/21/2003	30	dry	61
1184000	Connecticut River at Thompsonville	12/9/2003	125†	dry	
1184000	Connecticut River at Thompsonville	4/6/2004	5	dry	34
1184000	Connecticut River at Thompsonville	7/22/2004	20	dry	
1184000	Connecticut River at Thompsonville	8/26/2004	56	dry	
1184000	Connecticut River at Thompsonville	9/23/2004	41	dry	
1184000	Connecticut River at Thompsonville	10/14/2004	27	dry	
1184000	Connecticut River at Thompsonville	12/14/2004	250	dry	
1184000	Connecticut River at Thompsonville	2/22/2005	58	wet	75
1184000	Connecticut River at Thompsonville	4/14/2005	12	dry	
1184000	Connecticut River at Thompsonville	6/1/2005	8	dry	
1184000	Connecticut River at Thompsonville	7/6/2005	170	wet	
1184000	Connecticut River at Thompsonville	8/3/2005	25	dry	
1184000	Connecticut River at Thompsonville	9/19/2005	200	dry	
1184000	Connecticut River at Thompsonville	10/11/2005	1500	wet	
1184000	Connecticut River at Thompsonville	12/19/2005	140	dry	
1184000	Connecticut River at Thompsonville	2/1/2006	52	dry	91
1184000	Connecticut River at Thompsonville	4/13/2006	1	dry	
1184000	Connecticut River at Thompsonville	6/27/2006	190	wet	
1184000	Connecticut River at Thompsonville	7/27/2006	78	wet	
1184000	Connecticut River at Thompsonville	8/24/2006	220	dry	
1184000	Connecticut River at Thompsonville	9/21/2006	520	dry	
1184000	Connecticut River at Thompsonville	10/11/2006	440	wet	
1184000	Connecticut River at Thompsonville	12/13/2006	120	wet	
1184000	Connecticut River at Thompsonville	2/6/2007	770	dry	76
1184000	Connecticut River at Thompsonville	4/4/2007	8	wet	
1184000	Connecticut River at Thompsonville	6/6/2007	380	wet	
1184000	Connecticut River at Thompsonville	7/17/2007	50	dry	
1184000	Connecticut River at Thompsonville	8/13/2007	16	dry	
1184000	Connecticut River at Thompsonville	9/11/2007	28	wet	
1184000	Connecticut River at Thompsonville	10/17/2007	29	dry	
1184000	Connecticut River at Thompsonville	12/12/2007	730	dry	

Single sample *E. coli* data (colonies/100 mL) from all monitoring stations on the Connecticut River (Segment 3) with annual geometric means calculated (continued)

Station Name	Station Location	Date	Results	Wet/Dry	Geomean
1184000	Connecticut River at Thompsonville	2/4/2008	820	dry	85
1184000	Connecticut River at Thompsonville	4/10/2008	4	dry	
1184000	Connecticut River at Thompsonville	6/30/2008	330	wet	
1184000	Connecticut River at Thompsonville	7/30/2008	57	dry	
1184000	Connecticut River at Thompsonville	8/28/2008	22	dry	
1184000	Connecticut River at Thompsonville	9/17/2008	30	dry	
1184000	Connecticut River at Thompsonville	10/21/2008	40	dry	
1184000	Connecticut River at Thompsonville	12/1/2008	1700	wet	
1184000	Connecticut River at Thompsonville	2/5/2009	110	dry	85
1184000	Connecticut River at Thompsonville	6/8/2009	6	dry	
1184000	Connecticut River at Thompsonville	7/27/2009	69	wet	
1184000	Connecticut River at Thompsonville	8/24/2009	460	wet	
1184000	Connecticut River at Thompsonville	9/17/2009	210	dry	

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather *E. coli* (colonies/100 mL) geometric mean values for all monitoring stations on the Connecticut River (Segment 3)

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
1912	At Glastonbury Ferry Dock	2006-2010	21	29	177	448	90
1913	At Rocky Hill Ferry Dock	2006-2010	21	30	104	285	51
1910	At Charter Oak Landing boat launch	2006-2010	21	29	166	602	65
1911	At Great River Park boat launch	2006-2010	21	29	96	256	47
1190070	Connecticut River at Hartford	2003-2009	14	23	85	228	47
1924	At Kings Island State boat ramp	2006-2009	13	26	218	549	138
1908	Adjacent to Parsons Road near RR crossing	2006-2010	5	7	83	175	48
1909	Upstream of entrance to canal	2006-2010	17	33	90	191	61
1184000	Connecticut River at Thompsonville	2003-2009	15	31	73	152	51

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gage at Hartford Bradley International Airport

REFERENCES

Costa, Joe (2011). Calculating Geometric Means. Buzzards Bay National Estuary Program. **Online**: http://www.buzzardsbay.org/geomean.htm

CTDEEP (CWF). Connecticut's Clean Water Fund. **Online:** http://www.ct.gov/dep/cwp/view.asp?a=2719&q=325578&depNav_GID=1654

CTDEEP (2010). State of Connecticut Integrated Water Quality Report. **Online:** http://www.ct.gov/dep/lib/dep/water/water_quality_management/305b/ctiwqr10final.pdf

CTDEEP (2011). State of Connecticut Water Quality Standards. **Online:** http://www.ct.gov/dep/lib/dep/water/water_quality_standards/wqs_final_adopted_2_25_11.pdf

CWP (2003). Impacts of Impervious Cover on Aquatic Systems. Center for Watershed Protection. **Online**: http://clear.uconn.edu/projects/tmdl/library/papers/Schueler_2003.pdf

Federal Register 67 (March 15, 2002) 11663-11670. Urban Area Criteria for Census 2000

Mallin, M.A., K.E. Williams, E.C. Escham, R.P. Lowe (2000). Effect of Human Development on Bacteriological Water Quality in Coastal Wetlands. Ecological Applications 10: 1047-1056.

MDC (2010). The Metropolitan District, Hartford Connecticut. Clean Water Project Page. Last updated, 2010. **Online:** http://www.themdc.com/abouttheproject.shtml

USEPA (2001). Managing Pet and Wildlife Waste to Prevent Contamination of Drinking Water. **Online**: http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_petwaste.pdf.

USEPA (2011a). Managing Nonpoint Source Pollution from Agriculture. **Online:** http://water.epa.gov/polwaste/nps/outreach/point6.cfm

USEPA (2011b). Riparian Zone and Stream Restoration. **Online:** http://epa.gov/ada/eco/riparian.html

USEPA (2011c). Land Use Impacts on Water. Online: http://epa.gov/greenkit/toolwq.htm